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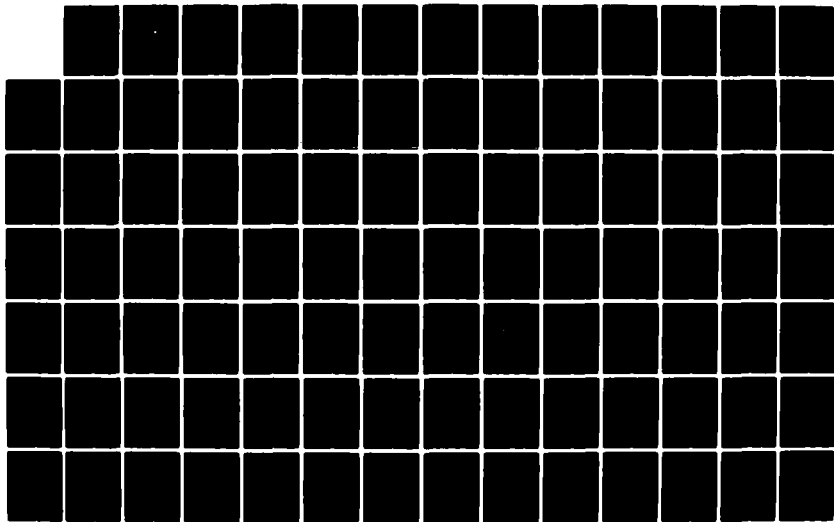
A SYSTEM ANALYSIS AND DESIGN FOR UPDATING THE INTERNAL  
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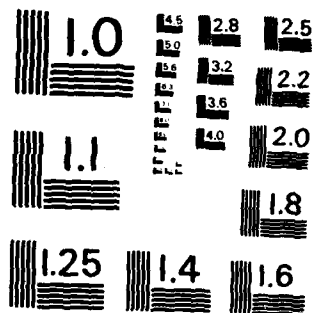
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# NAVAL POSTGRADUATE SCHOOL

Monterey, California



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## THESIS

A SYSTEM ANALYSIS AND DESIGN FOR UPDATING  
THE INTERNAL TRACKING OF THE QUALITY  
DEFICIENCY REPORTING SYSTEM AT THE  
NAVY'S FLEET MATERIAL SUPPORT OFFICE

by

Michael D. Carriger

June 1983

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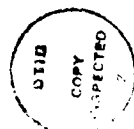
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A System Analysis and Design for Updating the  
Internal Tracking of the Quality Deficiency  
Reporting System at the Navy's Fleet Material Support  
Office

by

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Submitted in partial fulfillment of the requirements  
for the degree of

MASTER OF SCIENCE IN INFORMATION SYSTEMS

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## ABSTRACT

This study provides the needed cost/benefit analysis, utilizing a standard systems analysis, to update the tracking of the Quality Deficiency Reporting System at the Navy's Fleet Material Support Office, Mechanicsburg, Pennsylvania.

This Thesis analyzes the present system, proposes an alternative manual process, establishes an interim Management Information System, and an analysis and proposal for an automated system using the concept of a local area network.

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## I. INTRODUCTION

With the increased emphasis within DoD and government agencies on cutting operating costs and improving operational efficiency, systems managers must start evaluating office automation options. The improvement in productivity is becoming critical for today's managers.

In this context, the small office environment becomes a prime consideration for office automation. These small offices typically represent a small fraction of the total organizational assets in terms of material and personnel, but they can represent a major problem in terms of organizational efficiency and effectiveness if left to fend for themselves too long.

Compounding this problem of data processing is the general inability of the small office to obtain the resources needed to automate their work. Often, the managers of these offices abandon efforts to improve efficiency and effectiveness. This abandonment is largely due to the manager's preception that the organizational goals are much larger than their small office and that competition

for organizational resources is therefore hopeless in view of the larger divisional needs. It is at this point that the manager has placed him/her self into a no win situation.

## II. PURPOSE OF THE STUDY

It is the purpose of this study to determine the viability of a full office automation system using standard systems analysis design techniques. This study will provide an analysis that will demonstrate in terms of cost/benefits and improved efficiency that automation or some other alternative is the most beneficial evolution in obtaining the productivity increases required.

### III. METHODOLOGY

This study used standard systems analysis and evaluation for developing a flexible system to process and monitor the Navy's Quality Deficiency Reports (QDR) through Fleet Material Support Office (FMSO), Mechanicsburg, Pennsylvania. The methodology of this work was accomplished in four phases.

#### A. INITIAL ANALYSIS

The information processing requirements of the office were analyzed along with the office's capabilities to process these requirements efficiently and effectively. This analysis was accomplished primarily through personal interviews with the personnel assigned to the Defective Material Section (Code 91423). During these interviews attitudes, beliefs, perceptions, motivations, morale, and job-satisfaction levels were surveyed as well as technical details about the actual flow of work. Additional interviews were conducted with individuals outside the office's direct chain as well to add breadth to the study. Among these were Item Managers and Fleet Activities. Samples of all forms used in the process were gathered and reviewed.

## **B. SELECTION OF A FEASIBLE APPROACH**

A literature search was undertaken to determine the best approach to the analysis and to determine possible alternatives to the present system. The search examined recent trends in office automation, specialized application programming, software packages, and commonly used hardware systems. The results of this research were integrated with the previously-determined needs of the office to provide a basis for the best approach to solving its needs.

## **C. ALTERNATE PROCESSES**

Before determining that a fully-automated process was the answer to the long range productivity goals, several alternate processes had to be developed, tested in theory or actual application, and judged as to their suitability.

## **D. EVALUATION OF AN APPROPRIATE SOFTWARE AND HARDWARE PACKAGE**

The Command had not made any commitment to any particular system. A survey of software packages and hardware systems available was made. Each package and system was evaluated on its ability to handle established requirements and offer maximum flexibility to the user.

#### **IV. SCOPE OF THE STUDY**

This study analyzed the present manual system to determine its requirements, identified areas where modifications could be made to improve short-term productivity, evaluated alternatives available for the improvement of long-run productivity, and recommends a systems design that will meet future requirements.

##### **A. RESEARCH QUESTIONS**

1. What short- and long-run productivity gains can be realized by a modification of present methods?
2. Can the automation of the tracking system now in use on the Quality Deficiency Reports lead to a better, more reliable system?
3. Will the systems analysis substantiate a fully-automated system?
4. Will it show that an alternative process should be used?
5. What problems need to be considered in the design of a general office automation system?

## **B. SUMMARY OF FINDINGS**

The analysis of the Quality Deficiency Report system revealed bottlenecks in both processing procedures and management style. Workload figures over the past four years plus the first four months of the present calendar year show an overall increase of 151% in the case load. There existed a large backlog that was over age (as defined by the governing instructions), representing hundreds of thousands of dollars in possible cash flow back to the Navy Stock Fund (NSF).

On site observations also revealed considerable resistance to any change in the method of handling the QDR. A number of conditions existed that reinforced this resistance and were felt to contribute equally to the frustrations being experienced by the analysts and managers of the QDR process.

A cost/benefit analysis showed that the cost of automating the process, as opposed to hiring more personnel and continuing the present system, would realize an initial pay back in approximately four months.

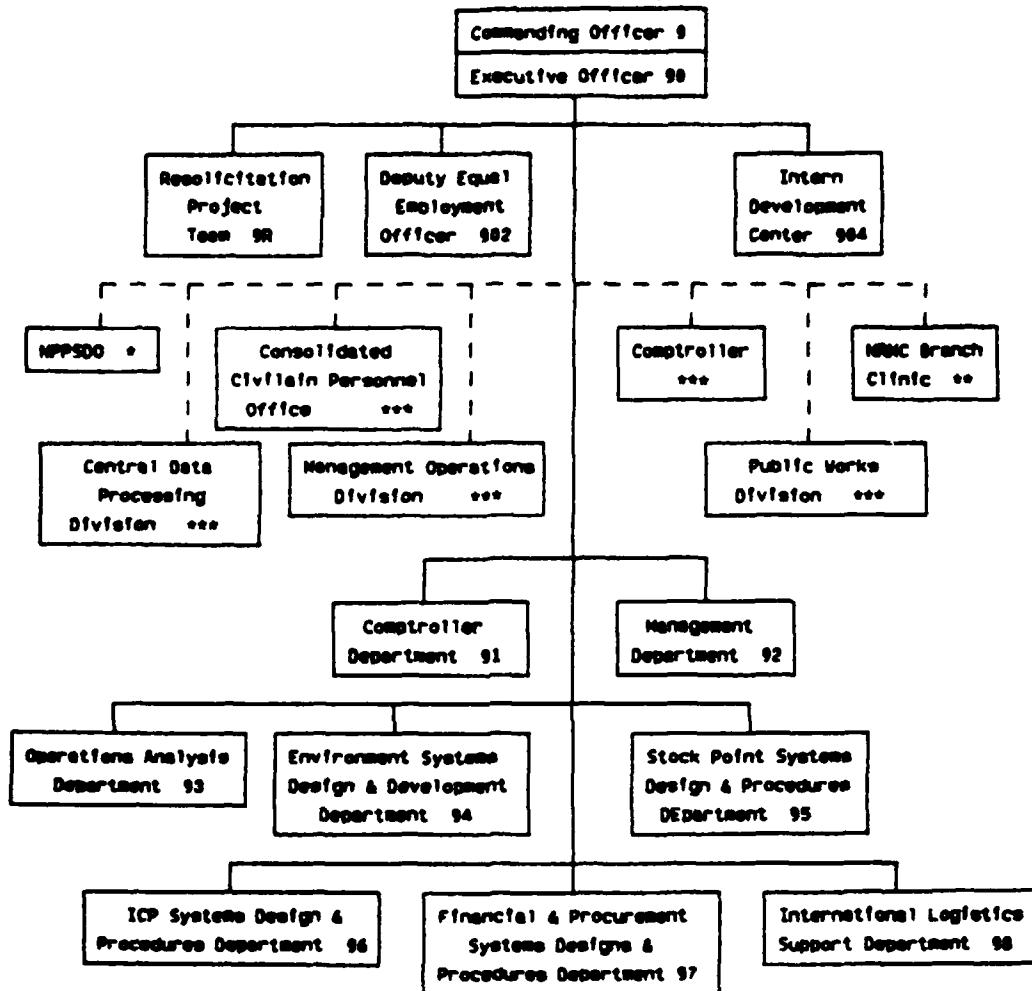
## **V. BACKGROUND**

### **A. QUALITY DEFICIENCY REPORTING SYSTEM OVERVIEW**

Navy Supply Instruction (NAVSUPINST) 4440.120E designates Fleet Material Support Office (FMSO) as the overall monitor for the quality deficiency management information reporting system. Within this framework, FMSO has the responsibility of: 1) notifying appropriate Navy activities of QDR material; 2) coordinating, recording and monitoring actions of managers; 3) ascertaining locations and quantity of QDR material at Navy facilities and 4) ensuring that timely disposition instructions are forwarded to Navy activities. The Command does not monitor QDR's in the area of subsistence, aviation, ammunition and certain medical, nuclear and systems command items. Figure 1 is the organizational chart for FMSO. QDR's are handled by the Technical Branch (code 9142) within the Comptroller Department (code 91). Figure 2 is the organizational chart of the Comptroller Department. Within the Technical Branch, code 91423 (Defective Material Section) is responsible for the actual processing of all QDR's.

There are two categories of QDR's: 1) category I, used to identify life threatening/highly hazardous

# Fleet Material Support Office Organizational Chart



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\*\* Medical Services by Navy Regional Medical Center Philadelphia, Pa.

\*\*\* Data Processing and Communication Services by Navy Ships Parts Control Center

Figure 1

Fleet Material Support Office Controller's Department Organizational Chart

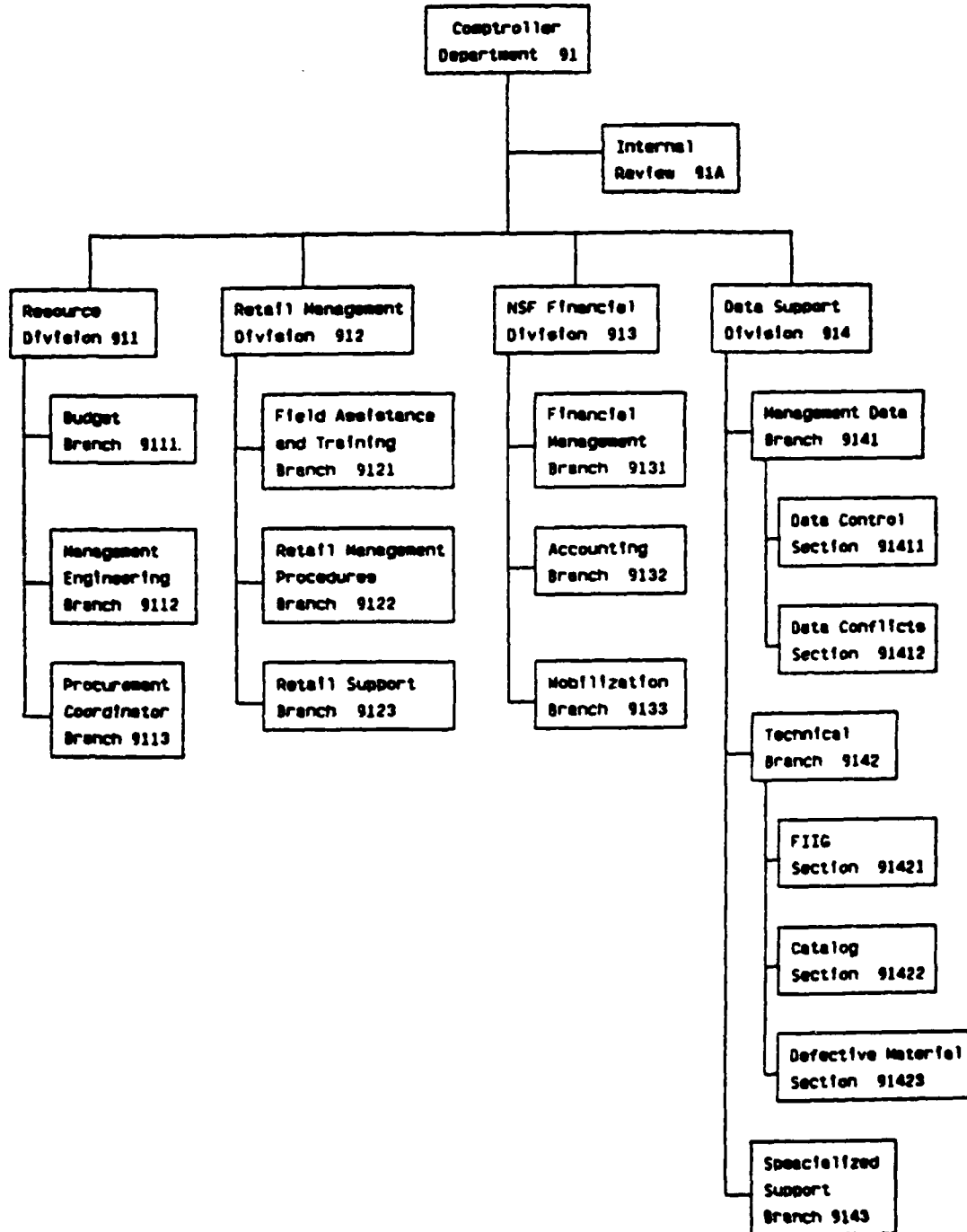


Figure 2

situations that must be processed within 24 hours of receipt and 2) category II, used to identify routine situations of a non-hazardous nature which must be processed by FMSO within ten days.

After processing the QDR through FMSO, the report is sent to the Item Manager (i.e. Defense Logistics Agency, Ship Parts Control Center, etc.) for a formal investigation into the nature of the problem (i.e. bad specifications, substandard material, etc.). When this investigative process between the government and the contractor has been completed, a determination is made as to whether the contractor will or will not reimburse the government. The Item Manager then issues disposition instructions back to FMSO. Upon receipt of these disposition instructions, FMSO reissues these these instructions to all commands affected. If credit to the government is indicated, it is then posted to the case file and the case is closed out.

#### **B. THE ORIGINAL SYSTEM**

Under the present system, daily mail and messages are picked up by the branch secretary. The traffic is then sorted and routed to the various sections. Quality Deficiency Reports (QDR's) and Reports of Discrepancy (ROD's) are routed to the Defective

Material Section, code 91423. QDR's are identified as Category I or Category II. Category I's are sent to the supervisor and Category II's are sent to a Supply System Clerk (SSC).

Figures 3, 4, and 5 show the overall flow of Category II's. The SSC determine the nature; e.g. Screening Receipt, New Case, or Existing Case. If the form is a Screening Receipt (Figure 3) (an acknowledgement by the Item Manager of receipt of a case now in work), it is placed in the case folder and filed, with no further action taken.

If the form is an action on an existing case (Figure 4), the case folder is pulled from the files and sent to the Supply System Analyst (SSA) responsible for that Cognizance Group (COG). The SSA determines if it is a request for additional information from the Item Manager, Final Disposition Instructions on the case or a Tracer Action initiated by the originator of the QDR. If it is a request for additional information, the SSA attempts to answer the request either from existing information or by going back to the originator. The SSA then drafts a reply back to the Item Manager and sends it out. The case file is updated and refilled. For Disposition Instructions; the SSA determines what has been directed to be done, drafts a message to all effected

Quality Deficiency Flow Diagram - Original System

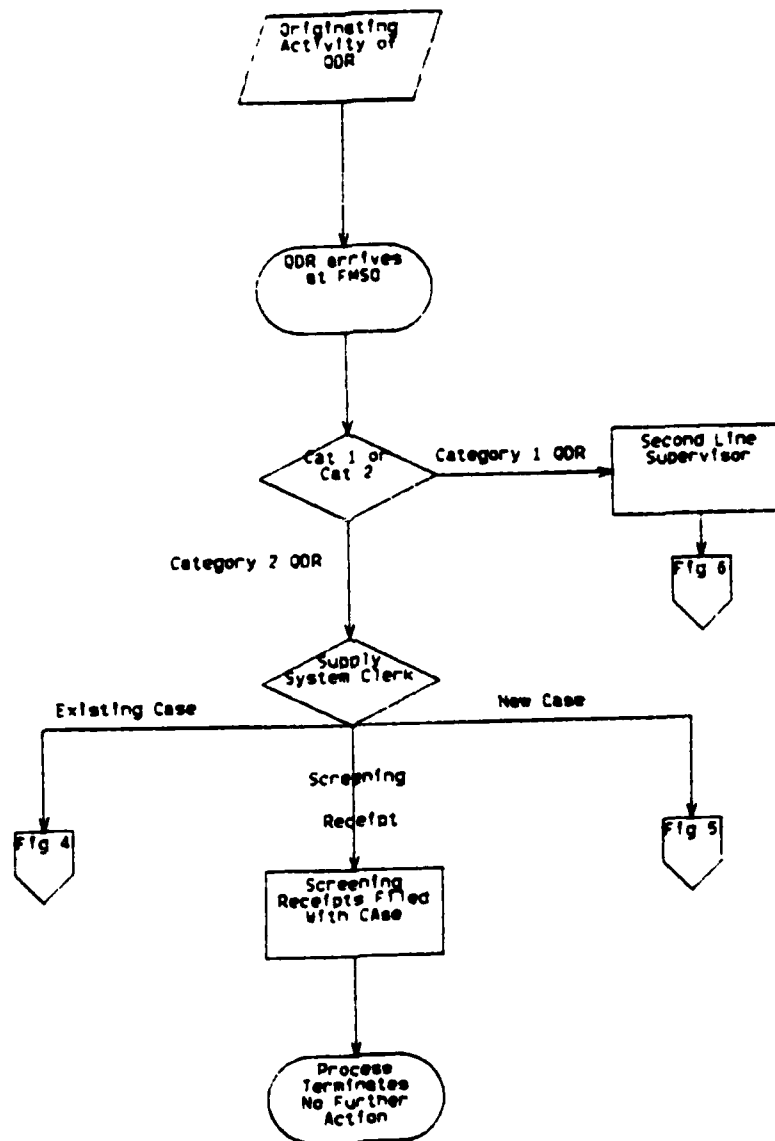


Figure 3

Quality Deficiency Flow Diagram - Original System (Category II)

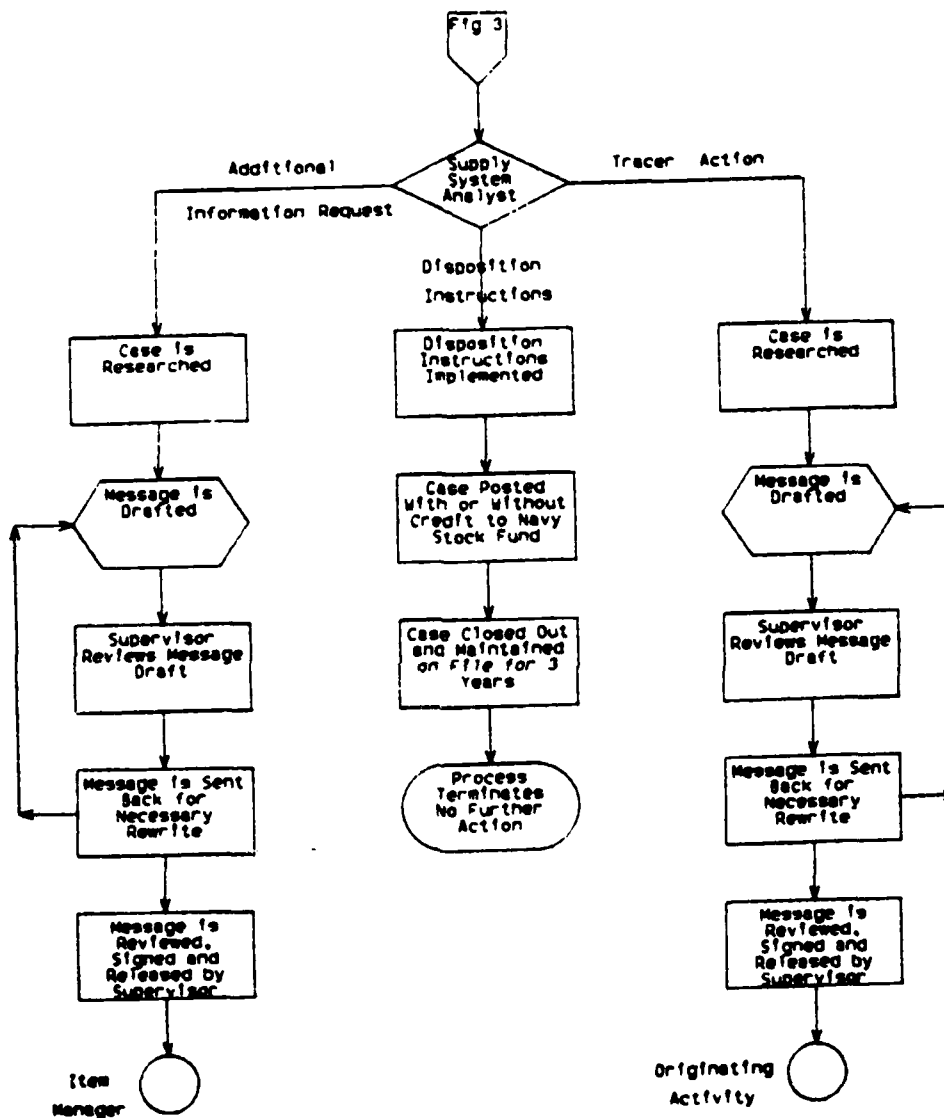


Figure 4

activities and releases it. If the Disposition Instructions indicate that the government is to receive credit, it is posted on the Case Report. The case is then sent to a SSC who enters the pertinent close out data in the current computer database and the case is then on file for three calendar years. For Tracer Actions, the SSA simply determines if a case is in existence and sends a reply back to the originator.

If the case is determined to be new or is a Report of Deficiency (ROD), the SSC sends the paperwork to an SSA for initial screening and review (Figure 5). This particular job is rotated on a monthly basis between all SSA's. If the case is an ROD, a form letter (OPNAV 5216/158) is attached as a cover and mailed to the shipping activity for action. No other actions are required of FMSO.

For a new case, the SSA screens the QDR for such things as Category II's that should be Category I's etc. The case is then passed to a SSC who verifies all data against the most current publications, researches the National Item Identification Number (NIIN) against a 3 x 5 card for previous QDR's enters pertinent new case data to the computer database, and then sends the case to the SSA handling that particular COG. The SSA screens the QDR, verifies

Quality Deficiency Flow Diagram - Original System (Category II Continued)

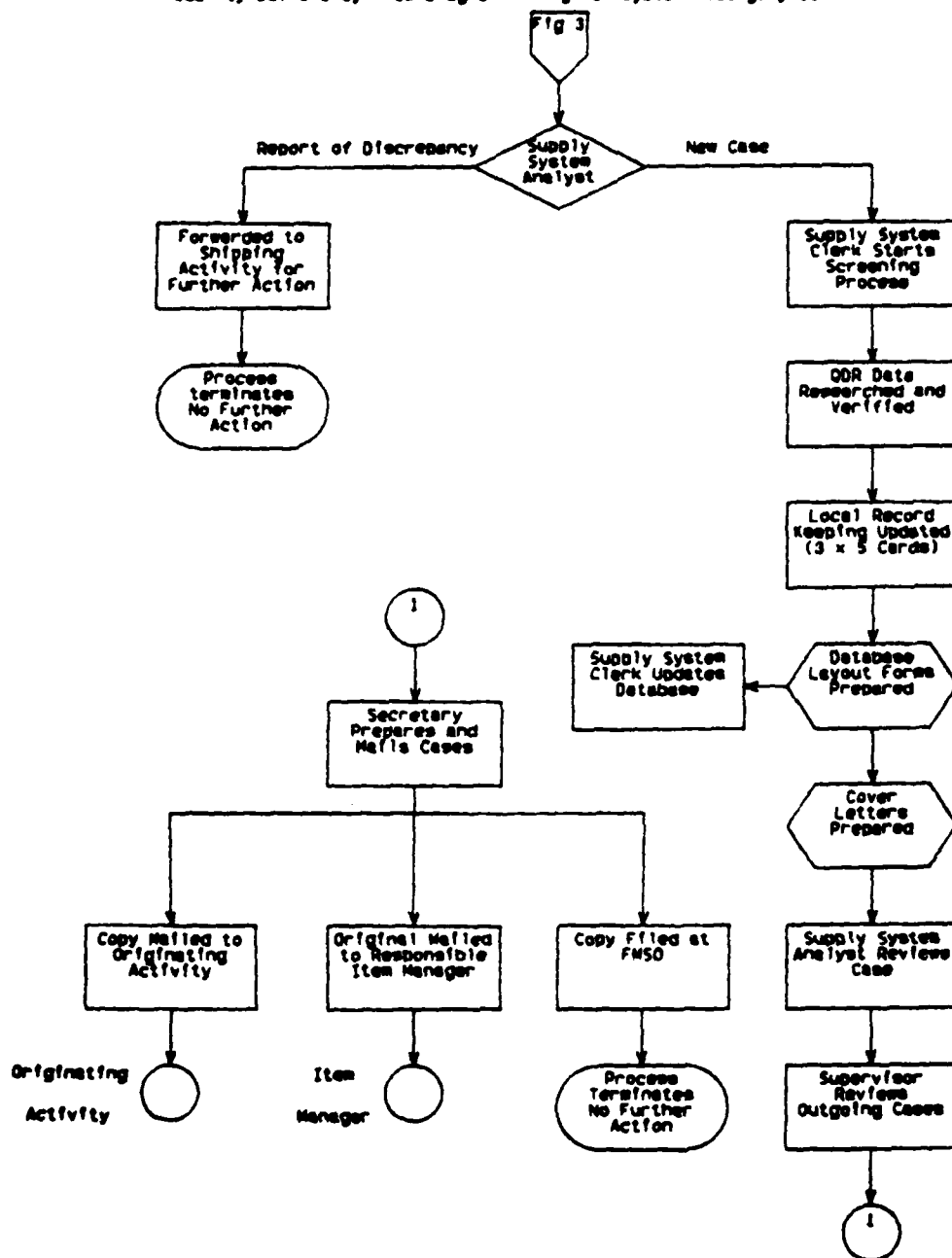


Figure 5

any information that may still remain in question, makes out copies of FMSO form 4440/12A, gets additional copies of the original QDR made out, sends a copy to the SSC for filing and has the original mailed to the Item Manager with a copy mailed back to the originator as a receipt.

Category I QDR's (Figure 6), are routed to the second Line Supervisor who personally screens them and decides which SSA should handle it. The SSA (Figure 7) then does the complete process of screening, verifying, assigning a case number, initiating/updating a local 3 x 5 control card, researching the item in question and drafting a new message to the Item Manager and the Originating Activity. The message then goes to the second Line Supervisor for review and back to the SSA for any corrections. Once approved, the message is signed and released by the supervisor.

Tracer actions, requests for additional information, screening receipts, and final disposition instructions are all handled in the same manner as for Category II QDR's except they all go through the second Line Supervisor.

At present, FMSO is using a General Electric (GE) time-sharing service. This service, based in Ohio, is accessed from the office by a single, 300 baud,

Quality Deficiency Flow Diagram - Original System (Category I)

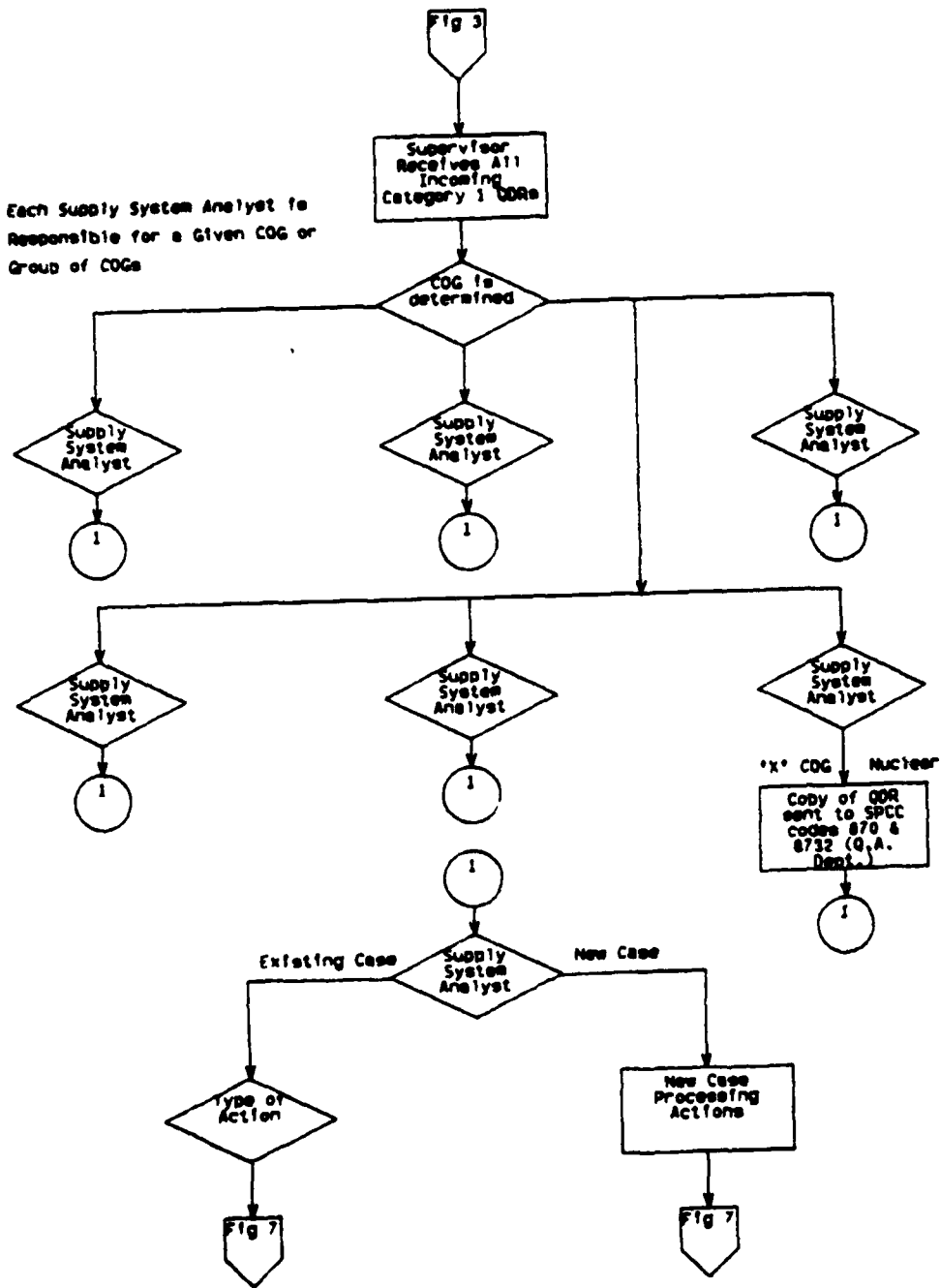


Figure 6

Quality Deficiency Flow Diagram - Original System (Category I Continued)

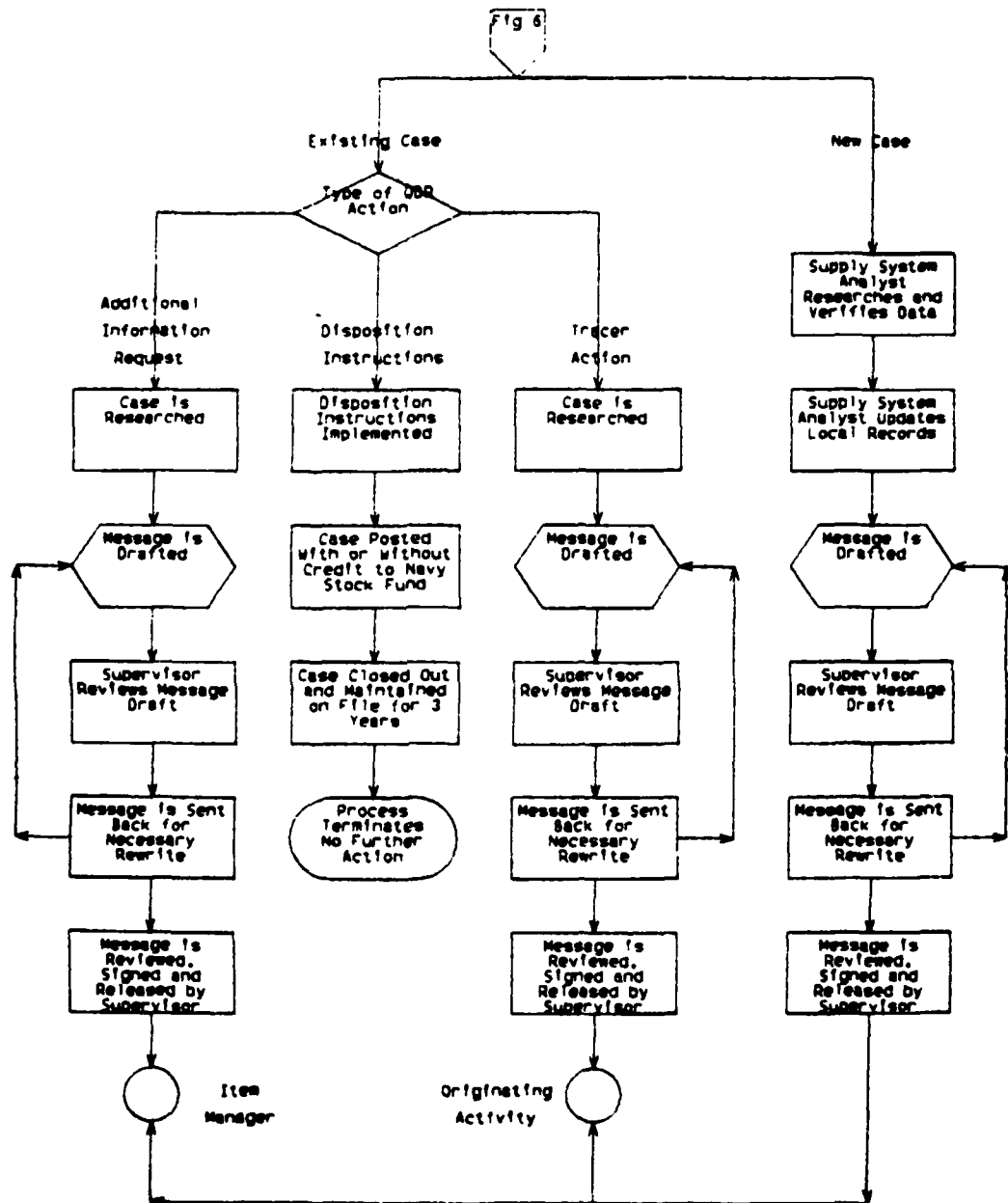


Figure 7

Western Union teletypewriter. Figures 8 and 9 are the system diagrams from the manual. Figure 8 shows the logical flow of QDR data from the originating activity to FMISO and then into the GE database. Figure 9 is a logical representation for the updating process of the database itself and the generation of requested reports. After receipt of a report request, the system holds the request in a queue until off-peak hours for processing. The reports are then mailed to the customer. Receipt of requested reports is generally within three to four working days of request.

This system is several years old. It now suffers both from a functional ability to keep pace with the present requirements of the office and from inefficient physical design. The work station in the office requires the operator to lean over and peer down behind a ribbon in order to read messages from the system. The system requires several minutes to respond to a request, making it time-consuming and costly. It has no online inquiry capabilities.

When the system goes down, there is no accurate process by which to determine what or how much data is affected. The Defective Material Section receives notification of system failures with possible data that may have been lost. This is the only

# Logical Flow of Quality Deficiency Reports to Database

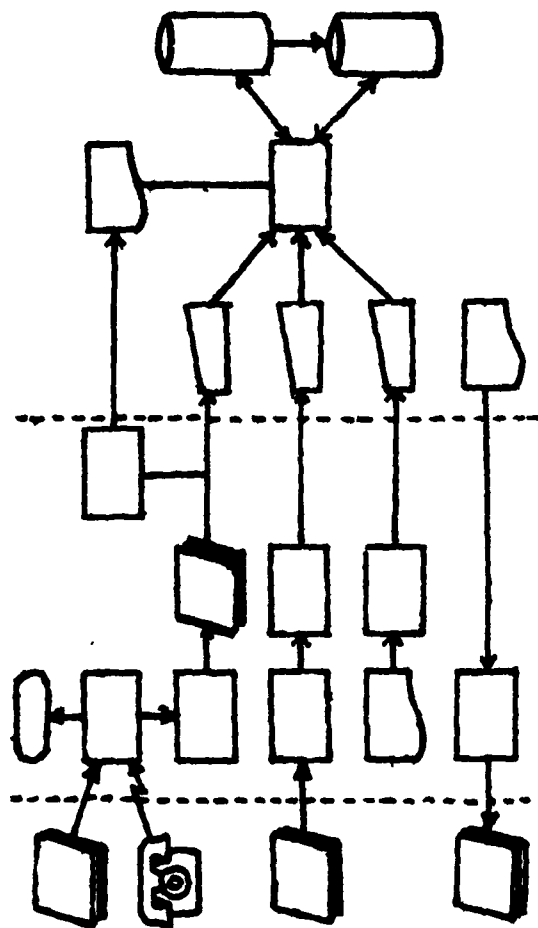


Figure 8

Logical Representation of General  
Electric Database Update Process

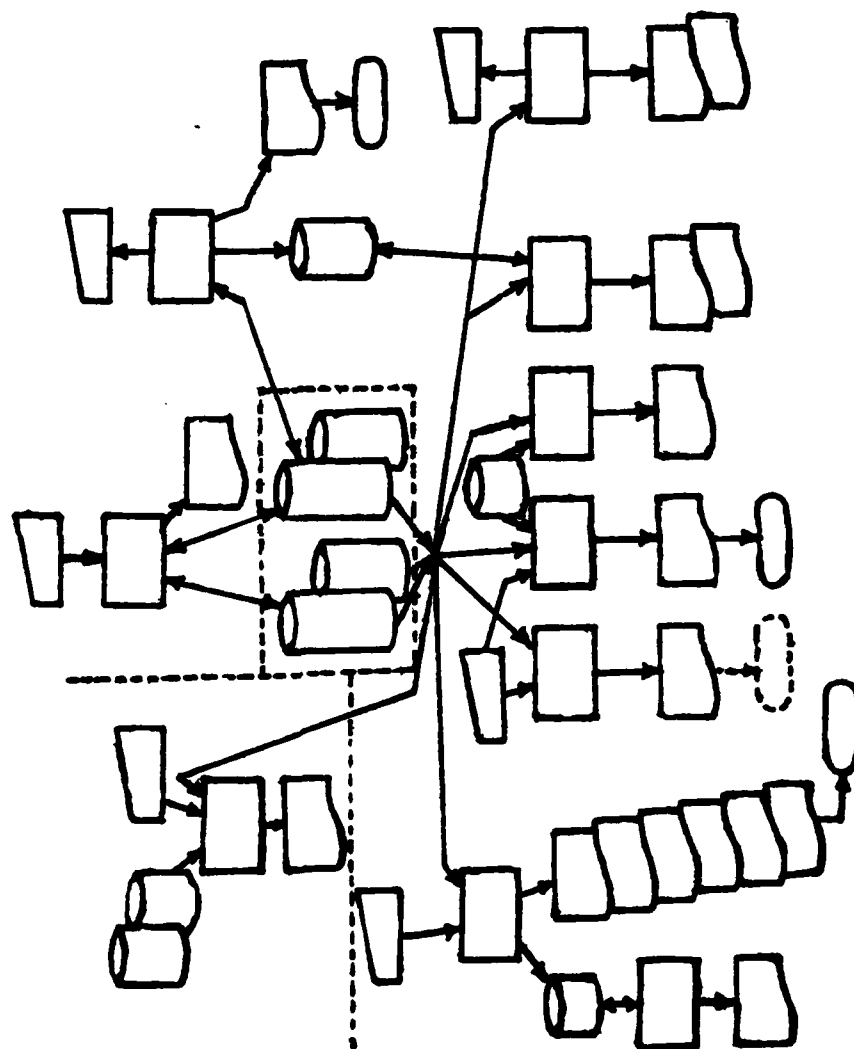


Figure 9

information available to the customer. This means that the office has to reenter all data from the days in question with no knowledge as to whether they were actually lost or not. The system will error trap duplicate entries of cases by case number; but in the mean time, it is not known how much work is actually wasted due to duplication. Furthermore, there is no positive way of knowing how much other work was lost. For these reasons information from the present system is suspect.

The system is currently accessed by a 1200 baud work station located in another office which allows the viewing of information directly on a CRT. This overcomes the problem of transmission speed. At present the system belongs to another branch and can only be used when that branch is not using it.

Last year the office had a budget of \$17,000 for the operation of the GE system. This year, the office had spent a total of \$18,000 as of April 30th. Next year's funding request ask for a total of \$30,000 in order to keep pace with the growing work load.

### **C. ANALYSIS OF THE ORIGINAL SYSTEM**

Several areas were noted as bottlenecks in the general flow in the present system. Follow-up

analysis revealed a combination of overly-restrictive management constraints, limited number of processing materials (NIIN microfiches, card decks with previous history filed, etc..) and individuals over-worked as a result of current vacancies in the staffing of the section.

Dotted lines in Figures 10, 11, 12, 13, and 14 show the areas that were identified for follow-up analysis. In each case, a bottleneck in the process occurs that results in the addition of from one to four days being added to the in-house turnaround time for Category II QDR's. The Category I QDR's were being handled within the instruction guidelines; though inefficiently. These were all physical constraints that were eventually corrected by a new QDR flow and rearrangement of management oversight.

Intangible problems included perceptions as to what was happening in the immediate environment. Morale within the entire Defective Material Section was found to be low, attributable to three factors: misperceptions as to what was happening with the vacancies in the first Line Supervisor and the third Line Branch Manager's (a Military Personnel Billet) job and the perceived notion of working in a job that had little or no prospects for advancement. The first Line Supervisor's job was being handled by the

Original Quality Deficiency Flow Process with Problem Areas Identified

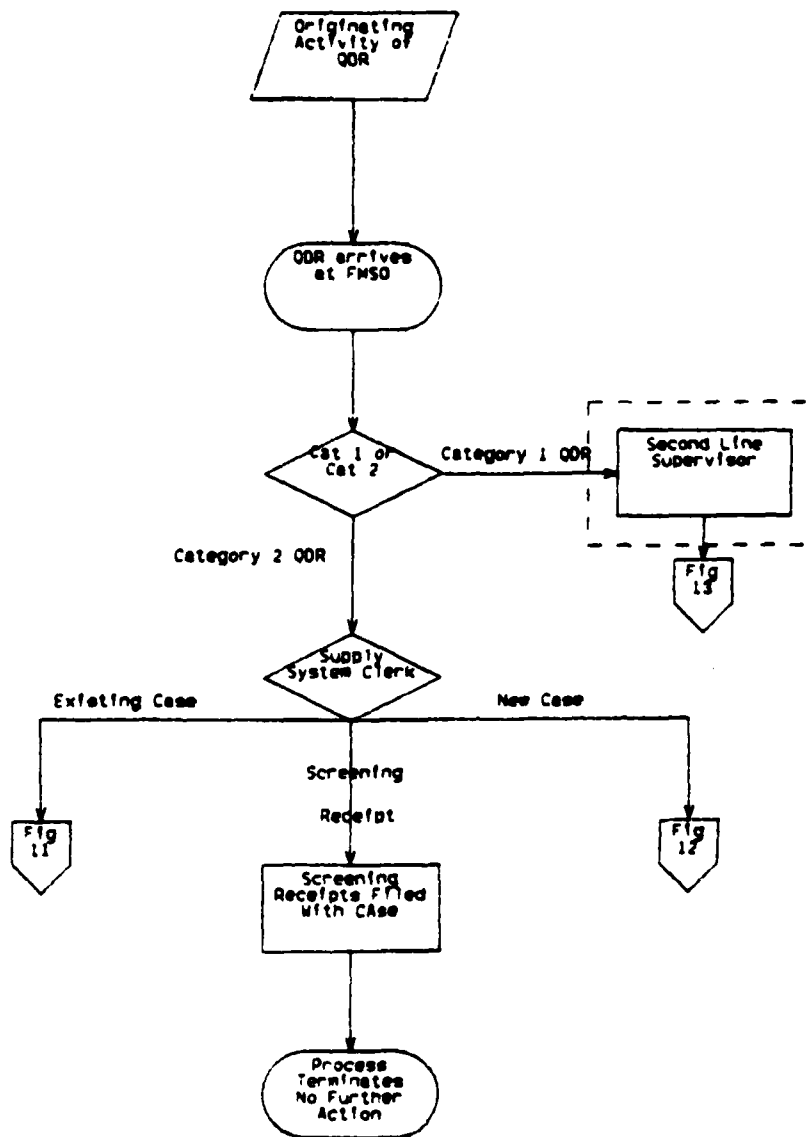


Figure 10

Original Quality Deficiency Flow Process With Problem Areas Identified (Category II)

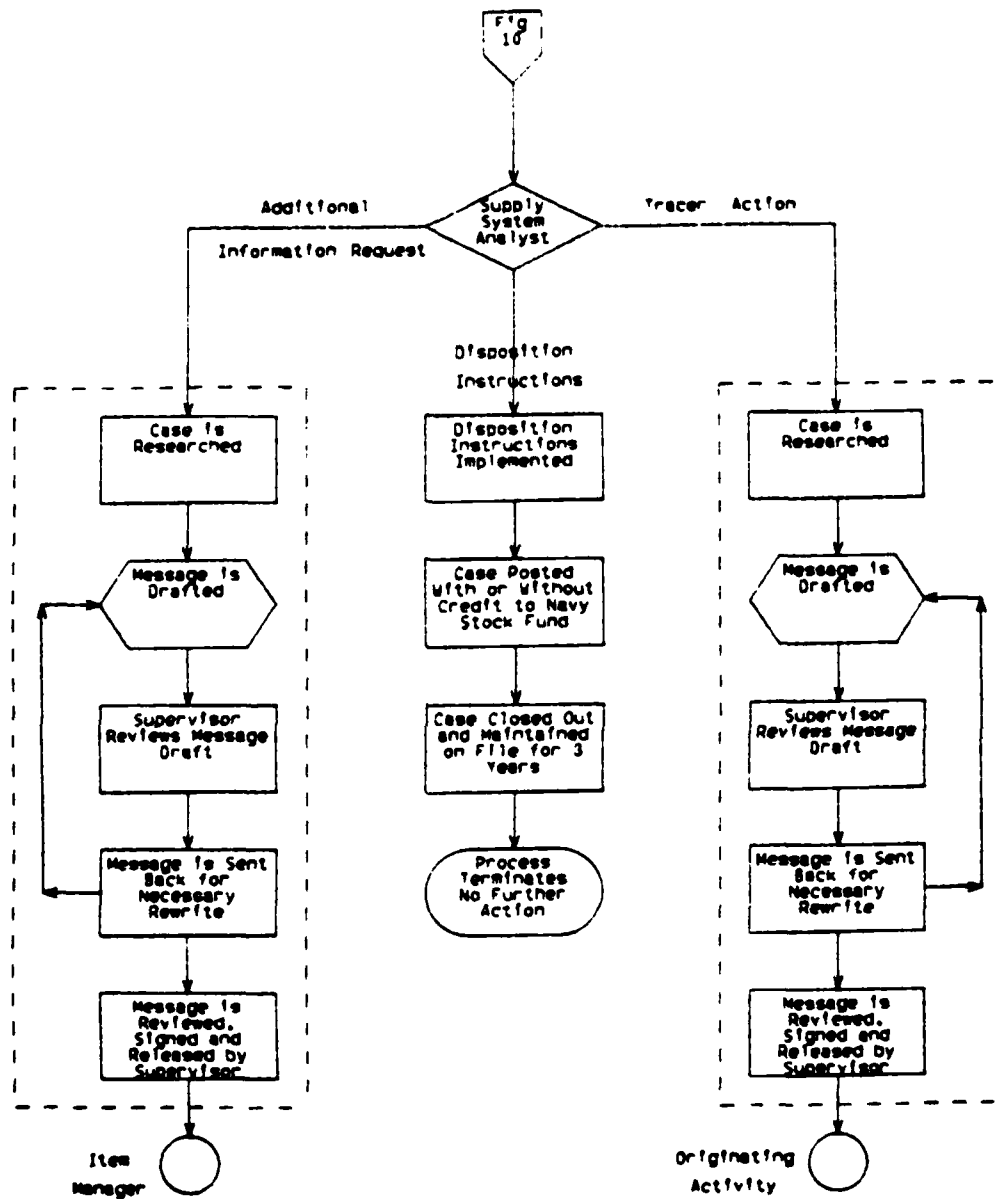


Figure 11

Original Quality Deficiency Flow Process With Problem Areas Identified (Category II Continued)

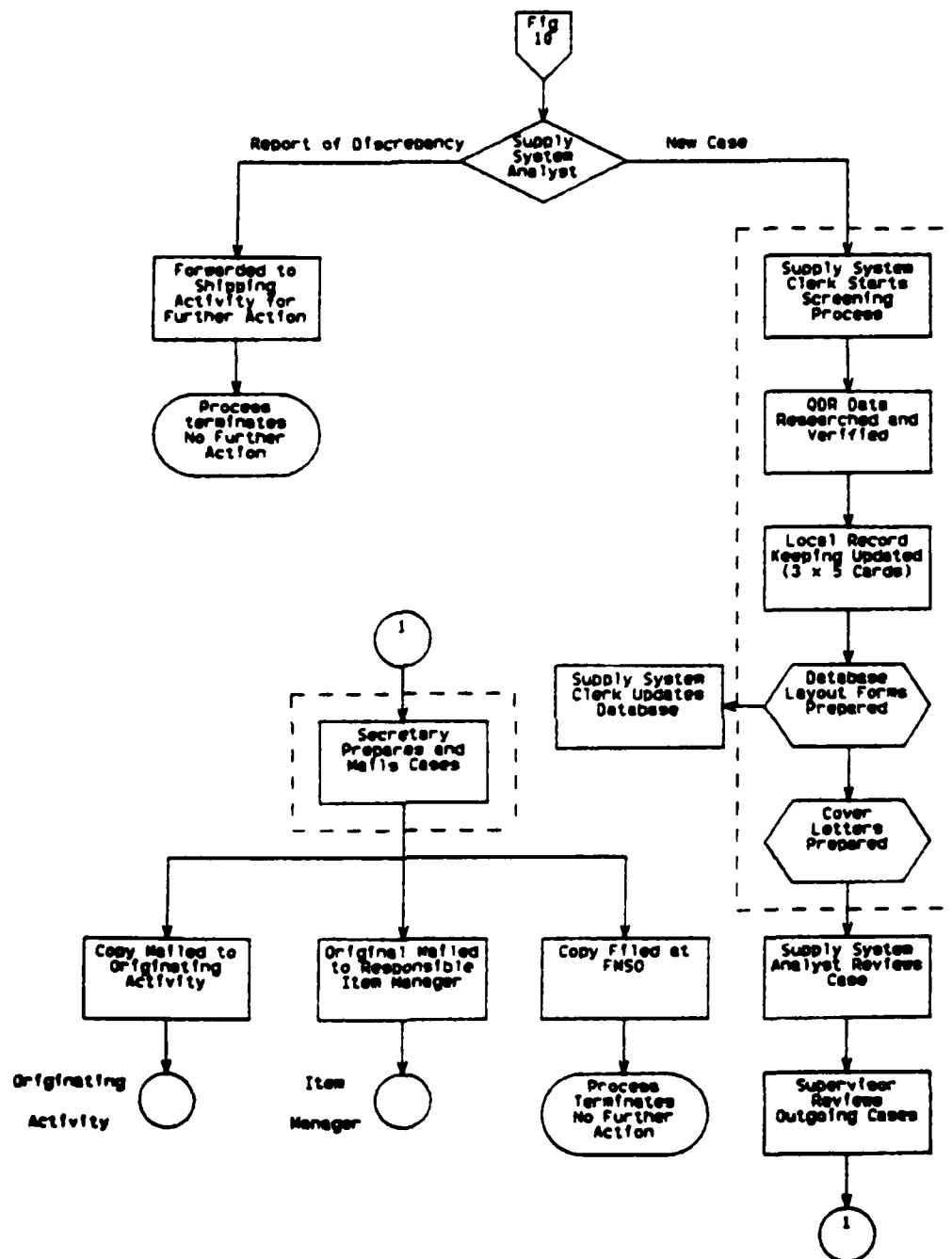


Figure 12

Original Quality Deficiency Flow Process With Problem Areas Identified (Category 1)

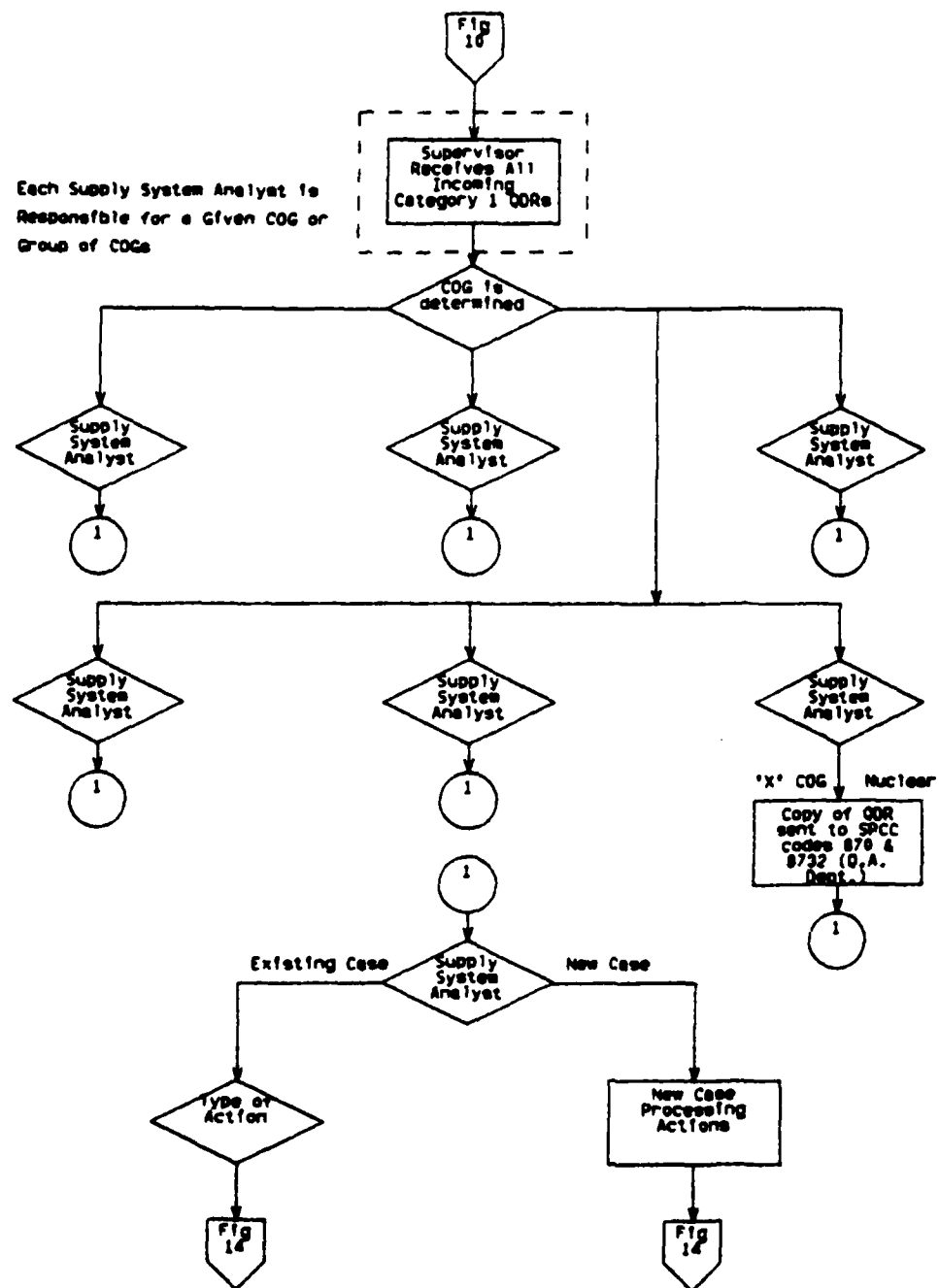


Figure 13

Original Quality Deficiency Flow Process with Problem Areas Identified (Category I Continued)

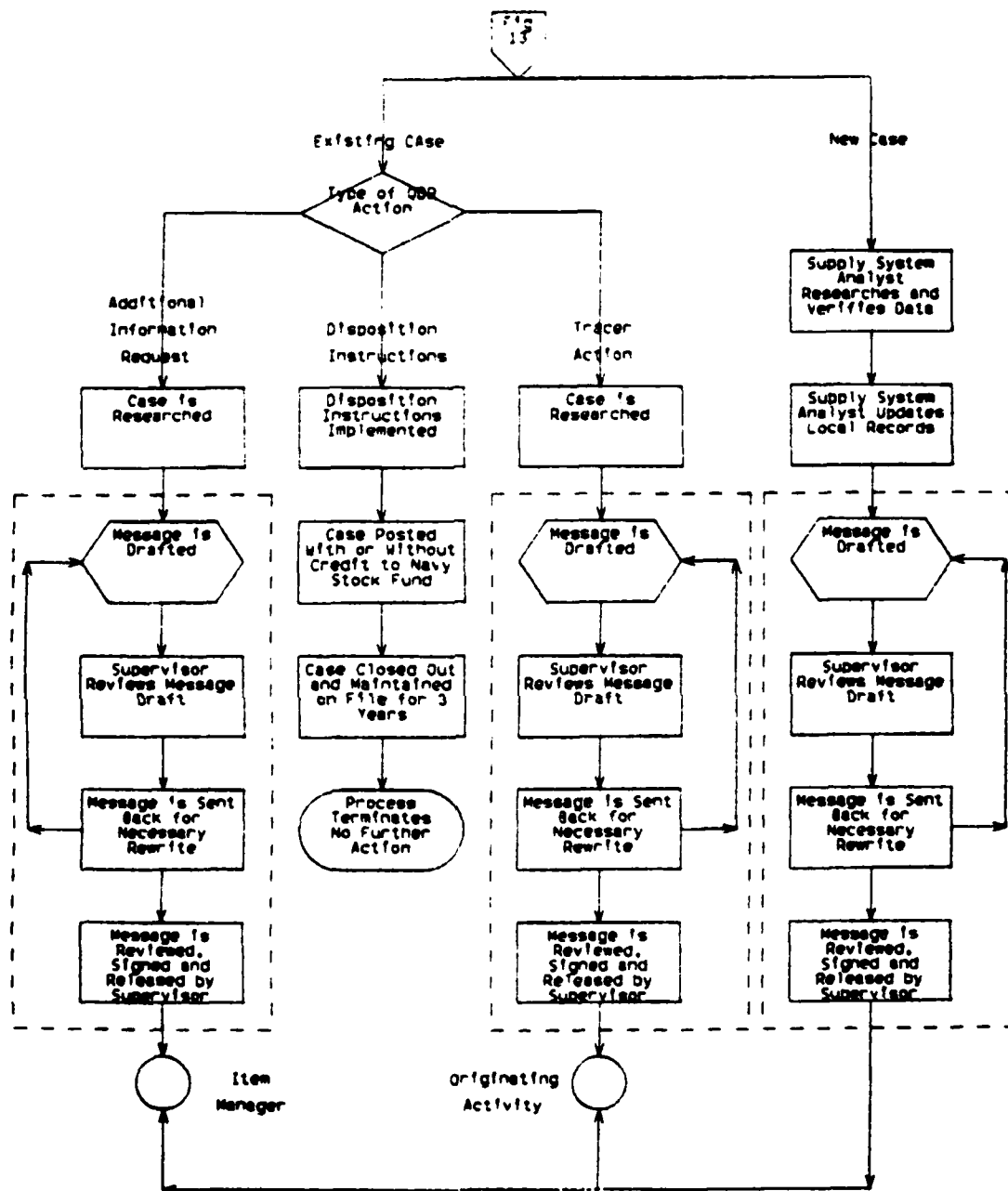


Figure 14

second Line Supervisor who oversees two additional offices and the third Line Branch Manager's billet was being temporarily filled by a GS-12 from another branch within the division, creating a less than optimal situation.

Largely, the Supply System Analyst comes to the job as a GS-9 with promotion opportunity available to only one GS-11 first Line Supervisory job within the section. Though lateral moves are possible, the personnel within the Defective Material Section view this as a difficult process.

Backlog is steadily increasing (see Table 1, page 52). The number of cases arriving daily are more than can be processed in the day; an average of 39 new cases arrive each day as opposed to 15 per day in 1979, an increase of 160%. Analysis of the case input flow revealed no predictable trends of totals within a given COG type. This lack of predictability makes the scheduling of work disorganized. On a daily basis, the volume of QDR's ranges from none to 170 new cases.

The manner in which cases were allocated created case load imbalances leaving some analysts under utilized and others over burdened. Some QDR's are simply a process of quick verification and routing to the Item Manager for action while others may require

technical research or phone contract with the originator. Time zone differences, ship-at-sea communications, etc., further delay the process. In addition to new cases, there are inquiries and tracer actions on outstanding cases that must be researched and sent out by the analyst who originally handled the case. Disposition instructions on outstanding cases arrive from the various Item Managers directing actions that may involve time frames established by legal actions.

Additional problems are caused by the method by which cases are handled when they arrive in the office. All cases are initially screened for correctness by one SSA and then sent to an SSC for more screening and verification. This creates a bottleneck in the flow at two consecutive locations. Finally, the QDR is distributed to the analysts according to COG. With the randomness of daily case load arrivals, this approach creates a very substantial imbalance of case loads. Once the case is processed by the analyst, an additional bottleneck is created; all cases are passed to the branch secretary to address and mail out.

Analysis of the current computer time-share system shows it to be inadequate for the office needs and should be either upgraded or replaced altogether.

With the case load continuing to increase year-to-year (see Table 1, page 52) the present system will continue to become more of a major cost and bottleneck in the processing of QDR's.

Thus, with the misperceptions of what was occurring with the current staff vacancies, the intervention of a Second Line Manager into the daily routine, and the increased work load, coupled with decreasing morale all added up to a situation that steadily grew worse. Add to this situation the manager's perception that the office is less than 1% of the organizational labor force and considerably less than 1% of the dollar assets and capital investment. Therefore, their problems are not of command level significance and no one really cares. The resulting combination of circumstances can quickly lead to a crisis.

#### **D. MODIFICATION OF THE EXISTING SYSTEM**

The areas outlined in Figures 10, 11, 12, 13, and 14 are the areas that were given detailed analysis. The results of these analyses were the foundation of the preliminary design of a fully automated system. Five major criteria were used:

1. How would an office automation system affect this flow process?

2. How much of that effect could be continued under a manual flow?

3. How much of an impact will a given change have in terms of human behavioral patterns?

4. What would have to be done in terms of training and commitment of office personnel in order to ensure the new system's success?

5. What impact would this change have on employee/management morale?

This approach was used to evaluate alternative methods to a full office automation. The above allows prediction of productivity, thereby facilitating projections of future capacity. The resulting flow process will produce a new system that will even the work load among the Supply System Analysts, allow easy identification of backlog, increase output, a rearrangement of management oversight procedures and a dramatic decrease in immediate backlog.

For Category II's, the process (Figure 15) was completely overhauled. Screening receipts are still filed away in the case folders as before. However, new cases and ROD's are placed in folders and the

Quality Deficiency Flow Diagram - New Flow Process

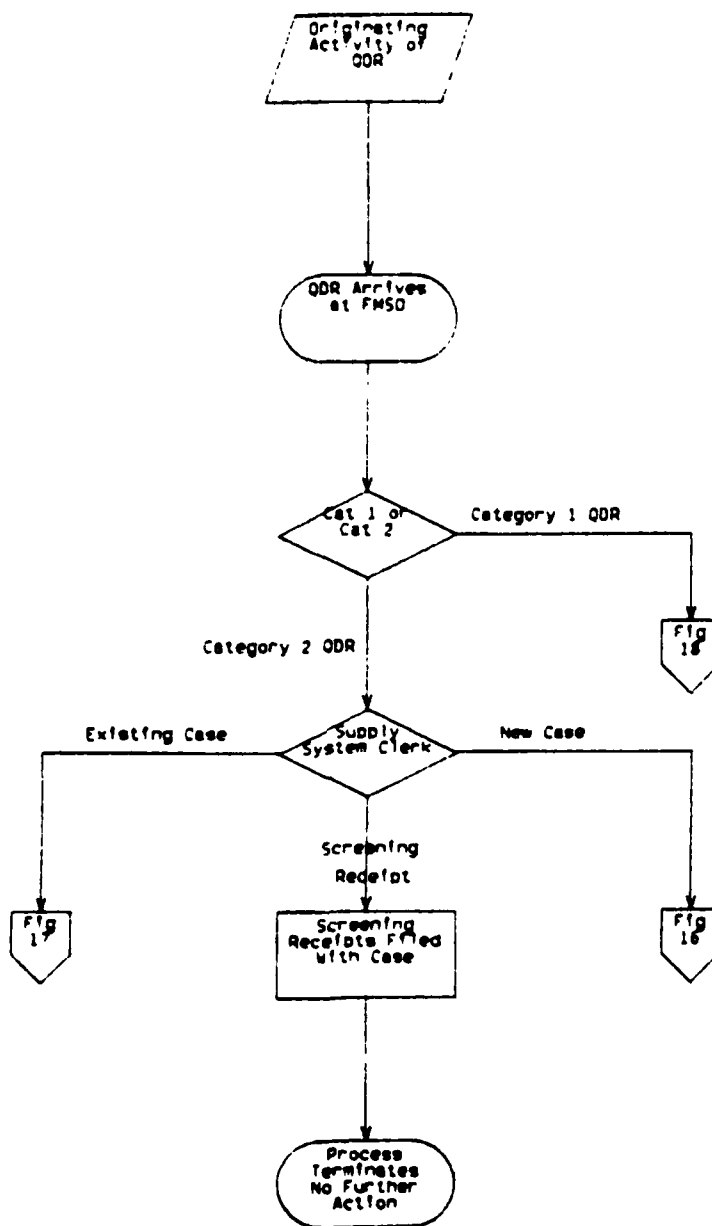


Figure 15

entire batch received that day are placed at the bottom of a backlog pile (Figure 16). This allows management and office personnel an immediate knowledge of real existing backlog and redundancy in the system is eliminated. When an SSA then does all necessary screening, validating and research, assigns the case number, makes all copies needed, prepares the cover letters and cases for mailing. The file copy is given to the SSC for filing and the secretary picks up the envelopes for mailing.

This approach essentially changes the type queuing system in which the QDR's were placed. Before, the method assigned a QDR to a given SSA regardless of the SSA's backlog. Now the QDR waits in a single queue for the next available SSA. This process evens the workloads, reduces the average waiting time for processing, and eliminates the bottlenecks by having fewer people work on the total flow of a case versus several people trying to handle an aspect of every case.

When disposition instructions, tracer actions and requests for additional information are received (Figure 17), the SSC pulls the case and identifies the SSA working on that case by the addition of an SSA code attached to the case number. The case is

Quality Deficiency Flow Diagram - New Flow Process (Category II)

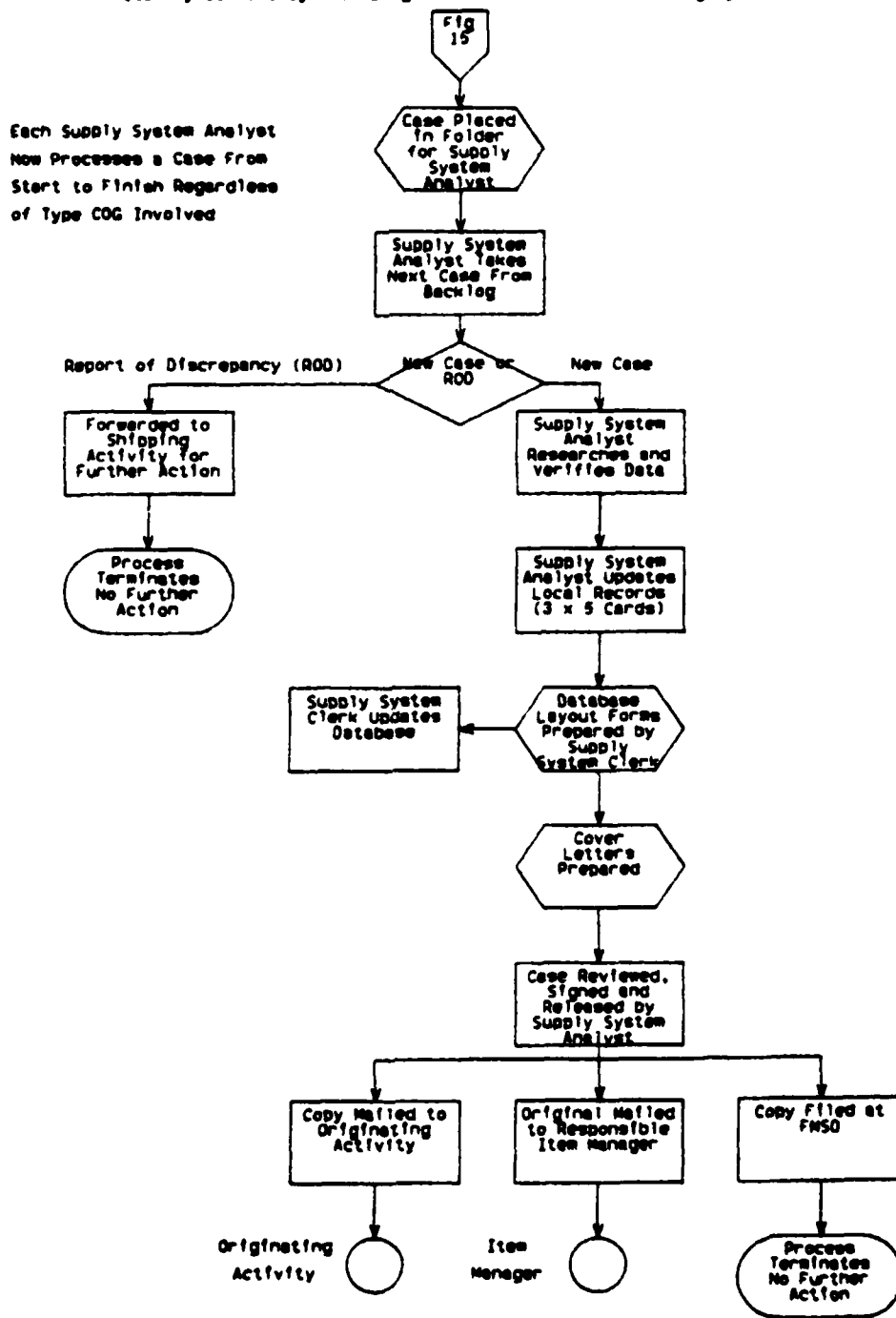


Figure 16

Quality Deficiency Flow Diagram - New Flow Process (Category II Continued)

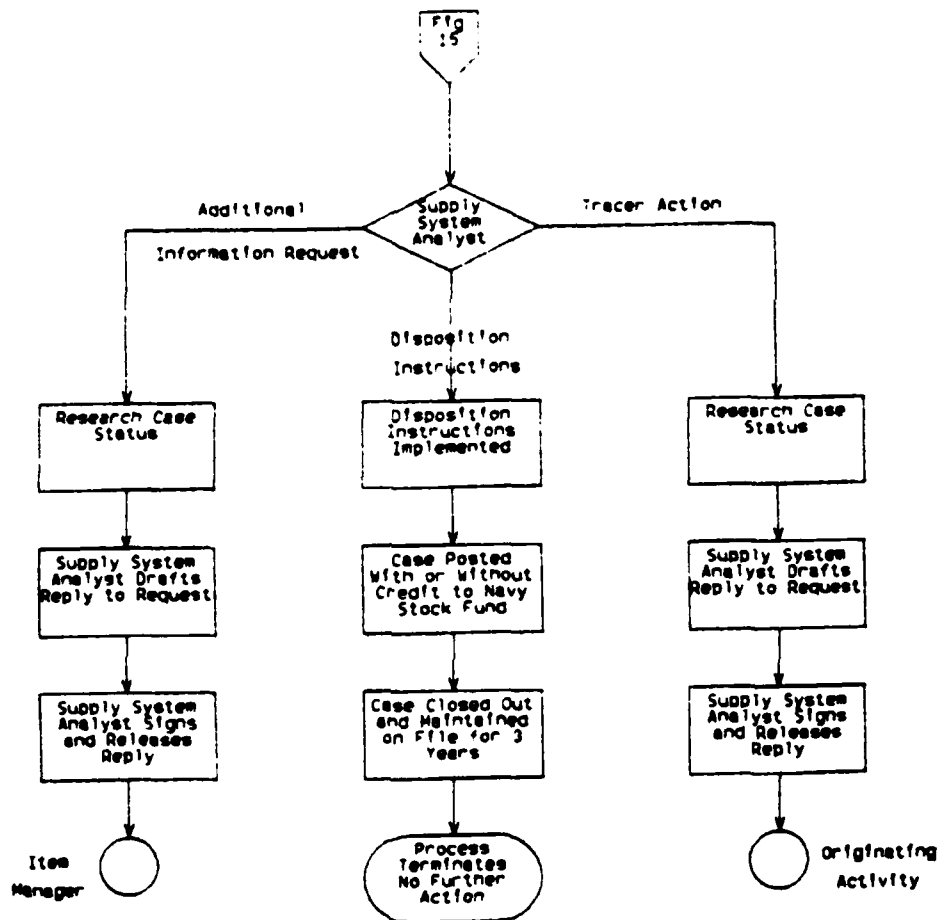


Figure 17

then placed in the SSA's incoming box for handling as before.

Category I QDR's and the limited number of nuclear material QDR's are handled differently. The second Line Supervisor is given a copy for management oversight only. All Category I's and 'X' COG Nuclear QDR's are now sent straight to one SSA who handles all the cases. Figure 18 shows this new flow. In this way, the other SSA's are never interrupted by an unexpected emergency case. If the SSA handling the Category I's and Nuclear cases finds him/her self caught up, s/he can help out with the Category II case load.

The implementation of this new process allowed a couple of things to be accomplished: 1) a significant reduction in the time to process a case was immediately realized as evidenced by the reduction of the backlog; 2) an alternative process to full automation was applied and evaluated; and 3) the process was moved closer to full automation.

In addition to these changes, a simple database consisting of a ten field record was added to the system. This system was added on the basis that it would not create an additional conversion problem later, would be easily maintained, not require an undue amount of labor time to keep up and would

Quality Deficiency Flow Diagram - New Flow Process (Category I)

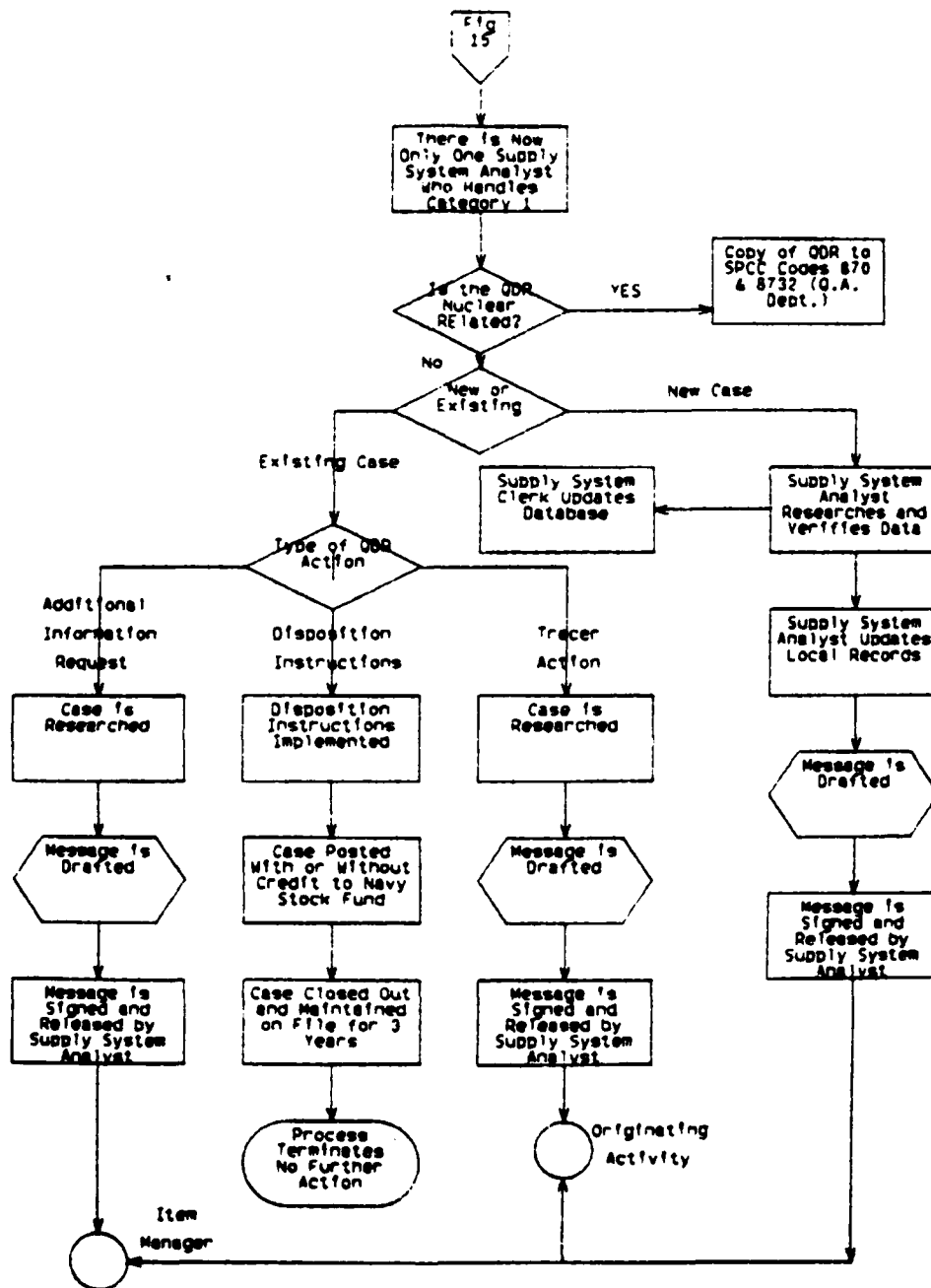


Figure 18

provide management with a means of acquiring data about the cases being processed without disrupting work flow.

This database was established on an IBM Personal Computer using dBase II. The reasons for this selection were: 1) the hardware and software had already been evaluated; 2) it was able to meet the processing requirements of the office; 3) both systems were easily obtained without further expense to the project; 4) it allowed for both initial training of office personnel and command programmers; and 5) it allowed for the initial evaluation of an office automation system in a practical application without creating follow-on problems or total commitment to full automation.

The database was created to allow tracking of:

- 1) average awaiting time a case experiences before being processed;
- 2) average processing time;
- 3) average turnaround time;
- 4) average response time of the Item Manager on cases (either overall or by specific Item Manager);
- 5) average turn around time required to process final disposition instructions;
- 6) average case load by analyst;
- 7) total number of cases in the system;
- 8) total number of Category I and Category II cases;
- 9) total number of cases in the office;
- 10) total number of cases awaiting Item

Manager response by Item Manager or composite total; 11) total number of cases in final disposition; 12) total number cases closed out to date; and 13) case load breakdown by COG and Item Manager. Figure 19 is a listing of the database structure and a sample printout of the records in the database. Appendix A is a complete listing of the application program developed using dBase II to manipulate the database and generate the management reports. Appendix B is the necessary data definitions used in the application program.

The database and application programs were developed as a means of evaluating the training requirements that would have to be considered in any decision to automate the office. Appendix A does not represent the final version of the application program used to drive this interim database. Rather, it was only a first cut at developing application programs using dBase II.

No modifications to the existing time share system were attempted when it was learned from the system programmers that to make one minor change would require approximately 80 man hours. The current system is still in operation pending final decisions concerning changes to the overall data flow within the office.

# LISTING OF DATABASE STRUCTURE AND SAMPLE RECORDS

Structure for file: MGR.DBF

Number of records: 00010

Date of last update: 00/00/00

Primary use database

FLD	NAME	TYPE	WIDTH	DEC
001	Date:in	N	004	
002	In:work	N	004	
003	Case:nr	C	010	
004	Cog	C	002	
005	Tech:code	C	002	
006	Im	C	004	
007	Cat	C	001	
008	Transmit	N	004	
009	Response	N	004	
010	Closeout	N	004	

\*\* TOTAL \*\* 00040

3001	3004	3-00001-00	9N	02	SPCC	2	3009	3052	3060
3001	3005	3-00002-00	9Q	03	DLA	2	3009	3055	3057
3003	3008	3-00002-0A	9Q	03	DLA	2	3011	3054	3060
3004	3004	3-00003-00	9Z	01	DLA	1	3004	3020	3021
3004	3010	3-00004-00	9L	06	DISC	2	3012	3040	3045
3004	3010	3-00005-00	2A	04	DISC	2	3012	3090	3097
3005	3011	3-00006-00	4C	02	DLA	2	3014	3080	3084
3006	3013	3-00007-00	2A	04	DISC	2	3019	3071	3079
3006	3013	3-00008-00	8Q	05	SPCC	2	3025	3099	3100
3006	3014	3-00008-0A	8Q	05	SPCC	2	3019	3100	3105

Figure 19

## **VI. PROPOSED AUTOMATED SYSTEM**

### **A. THE DECISION TO AUTOMATE THE SYSTEM**

While the changes from the old flow process to a more streamlined process achieved the desired short-run effects of reducing the immediate backlog, streamlining the process and improving productivity, there still existed areas where the manual process involved could not be improved beyond a certain degree. Further analysis revealed that long-run requirements were not going to be met in view of the continued upward trend of case loads. An effort to determine the reasons behind the sharply-increased number of cases in the past couple of years revealed a greater emphasis being placed on the QDR system and the addition of areas not previously covered by the QDR. This led to the conclusion that the number of cases in coming years would continue to increase. Analysis of 1983 caseload for the period of January through April shows a projected work load in excess of 10,000 cases. This data reveals a potential case load increase for 1983 over 1982 of over 51%. Based on this upward trend, it was decided to continue the evaluation process toward an office automation system.

## B. THE COST/BENEFIT ANALYSIS

As was stated earlier, the flow of cases into FMSO revealed no significant pattern during any particular time except that the total number of cases per year has grown at a rate of approximately 50% per year during the last two years. Table 1 is a breakdown by year showing the total number of cases that came in to FMSO, an average monthly case load, the growth rate between one year and the next, and the overall growth rate that the office has experienced from January 1979 to the end of April 1983.

TABLE 1  
ANNUAL CASE LOAD AND PERCENTAGE CHANGES

YEAR	YEAR TOTAL	MONTHLY AVERAGE	% CHANGE	TOTAL % CHANGE
1979	4002	333.5		
			4.4%	
1980	4178	348.2		
			9.5%	
1981	4573	381.1		159.9%
			48.9%	
1982	6809	567.4		
			44.3%	
1983*	10320	860.0		

\* Projection of workload for 1983 based on January - April 1983 totals.

Currently, there exists a need in the office for one GS-3, two GS-4's and two GS-5 Supply System Clerks, and

for one GS-11 first Line Supervisor. Table 2 shows average salaries (plus 30% for benefits) as computed by FMSO using the NAVCOMP Manual formulas for computing local average acceleration tables for salaries paid to government service personnel. The GS-11 first Line Supervisor is not included in this table, as it was felt that there would be a need to fill this position regardless of the system. Therefore, a position of cost avoidance was taken in the cost/benefit analysis of any system under consideration. Table 2 further shows the cost of the current time-sharing system that is currently installed. Using the following equation derives an hourly rate of current operations.

$T_s$  = Total salaries  
 $T_{ss}$  = Time share sytem  
 $H$  = Work hours per day  
 $W_d$  = Work days per month  
 $M$  = Months per year  
 $H_r$  = Hourly rate of current operations

$$\frac{T_s + T_{ss}}{H \cdot W_d \cdot M} = H_r$$

$$\frac{\$91,617 + \$50,000}{2004} = \$70.68$$

**TABLE 2**  
**AVERAGE SALARIES AND COSTS OF CONTINUING ORIGINAL SYSTEM**

<u>RATE</u>	<u>STEP 1</u>	<u>STEP 10</u>	<u>AVERAGE</u>		<u>BENEFITS</u>		<u>TOTAL</u>
GS-3	\$10,645	\$13,840	\$12,242	*	1.30	=	\$15,915
GS-4	\$11,949	\$15,531	\$13,740	*	1.30	=	\$17,862
GS-5	\$13,369	\$17,383	\$15,376	*	1.30	=	\$19,989

Average Annual Salary  
Plus Benefits

----- = Hourly Rate  
2004 Working Hours  
Per Year

<u>RATE</u>	<u>HOURLY RATE</u>
GS-3	\$ 7.94
2 * GS-4	\$ 8.91
2 * GS-5	\$ 9.97
<u>TIME SHARE</u>	<u>\$24.95</u>
TOTAL HOURLY RATE OF PRESENT SYSTEM	\$70.68

$\$15,915 + (2 * \$17,862) + (2 * \$19,989) = \$91,617$

Budgeted Cost of Current Time Share System for  
Next Year = \$50,000

Total Salaries + Time Share System = \$141,617

Assuming that the hiring of these additional personnel can be avoided and that the current time-share system is discontinued, direct annual costs savings of \$141,617 can be realized. Assuming that an automated office system would cost approximately \$50,000, the initial payback period is approximately four months as shown by the following calculations:

**T<sub>sc</sub>** = Total system cost  
**H<sub>r</sub>** = Hourly rate  
**A<sub>wh</sub>** = Average work hours per day  
**A<sub>wd</sub>** = Average work days per month  
**P<sub>p</sub>** = Payback period measured in months

$$(((T_{sc}/H_r) / A_{wh}) / A_{wd}) = P_p$$

$$(((50,000/70.68) / 8) / 22) = 4.02 \text{ months}$$

payback period

The figure of four months represents a maximum payback time since the only values taken into consideration at this point are the direct cost savings that can be easily determined. Table 3 shows the total amount of money credited back to the Navy Stock Fund (NSF) in calendar years 1981 and 1982. Averaging these two years together and computing the daily average amount of cash flow back to the NSF each working day is worth \$16,780 in average cash flow.

**TABLE 3**  
**QUALITY DEFICIENCY REPORT CREDITS BACK TO THE NAVY STOCK FUND**

<u>YEAR</u>	<u>CREDITED TO NSF</u>		
1981	\$4,452,416	1981 + 1982	
		-----	= \$16,780
1982	<u>\$4,407,504</u>	22 Days * 12 Months	
AVERAGE	\$4,429,960		



The first figure is the minimum cost of a thirty-seven-day average age backlog. If this backlog could be turned around in one day, a thirty-seven-day average age backlog can represent a considerable amount more in terms of cost and interest as seen by the second computation above.

There is another way of looking at the cost of a backlog. Totaling the amount credited back to the NSF in calendar years 1981 and 1982 and dividing by the total number of cases processed during those two years results in an average value that each case represents. Multiplying this case value by the number of cases currently in the office at any given point in time results in an average value of the backlog.

Total 1981 & 1982 Credits  
 ----- = Average Value of a Case  
 Total Cases for 1981 & 1982

\$4,452,416 + \$4,407,504  
 ----- = \$778  
 4,573 + 6,809

800 cases \* \$778 = \$622,400

This final figure is very close to the the figures obtained earlier. When either set of figures is brought into the cost/benefit analysis, the mere ability to keep the processing time of the cases within the tens day alone means a payback of the system costs within weeks rather months.

There are some other areas where savings can be realized that are not so dramatic. Currently, the work is being handled by six Supply System Analysts and three Supply System Clerks. An analysis of actual production hours revealed that 312 days (12% of available work time) were lost to annual leave and sick time. Effectively, the office was functioning one person short. While overtime was not being heavily used in the office, what was being used was only making up for the effective loss of the one person.

Another area for consideration is that of the Supply System Analysts. Currently, all but one of the SSA's were brought into the office as a GS-9. The other analyst was hired originally as a 5-7-9 trainee. This SSA is functioning as well as any of the others in ability to handle the workload. It is conceivable that, as the current analysts retire/transfer, new analysts could be brought in the same manner. This procedure would allow for the

possibility of growth on the job, less cost to the government during the training period, add the needed infusion of younger ideas, and instill an uplift in general morale.

The intangible benefits that will be realized by this streamlining of the FMSO process will mean the elimination of a major bottleneck in the flow of cases from the Fleet to the Item Managers and back to the fleet. This will not be in terms of just new cases but in all transactions within the QDR process and will effect the whole Navy Supply System, producing shorter response times that will translate into a better supply system and improved cash flow back to the NSF.

#### C. THE PROPOSED AUTOMATED SYSTEM DESIGN

The long range plans of FMSO are to install a computer-based Management Information System. It was, therefore, decided that this project would be the ideal place to start by using a prototype implementation process. Under this process, the user and the developer can work more effectively toward the end goal of achieving a viable system. The prototyping process allows for a fairly quickly produced user product that is a starting point for

evaluation and critical analysis. The developer can then revise and install a new intermediate version. This flexibility allows unforeseen applications to be incorporated into the overall system with a minimum of disruption.

The advantages of this approach are: 1) The system is introduced fairly quickly; 2) because the system is not a final product, it is easier for the user to learn; 3) it forces structure to the applications development to allow changes to be made easily and quickly without complete rewrites; 4) it allows the users to realize their real needs as opposed to their perceived needs; 5) it allows the user to grow with the system rather than have it handed to them as one immense, overwhelming package; 6) the end product will be closer to the actual system requirements than other methods provide, and 7) it allows for a smoother transition between developer and user. This transition can be accomplished smoother than with other methods since the user's staff has been involved with the development of each version of the system and thus are already familiar with the system. A negative factor to be considered is that it can prove to be more expensive in terms of actual system development time than other methods. Also, there has to be a

definite point at which the in-house staff assumes responsibilities for any further development and maintenance.

Figure 20 is a logical representation of the proposed system. It includes ten IBM PC work stations; two printers (one correspondence-quality daisy wheel printer for message traffic or fine letter-quality reports and one high-speed dot matrix printer capable of producing 15-inch-wide reports for internal use), and a network system that allows all workstations to use a shared central database. Initial prototyping of the system will be accomplished at the Naval Postgraduate School in a Thesis by Ron Nichols. In this stage the network will only utilize up to four IBM PC's to aid in the evaluation of the best ways to handle the issues of database management protocols. When research and development at the Naval Postgraduate School is felt to be sufficiently complete, personnel from FMSO will be invited to evaluate its initial performance prior to installation. Additional IBM PC's will be added during final assembly at FMSO to bring the total number of stations to ten. Further development of the system will then be turned over to FMSO after a short in-house, full system evaluation.

Logical Representation of Proposed Automated System

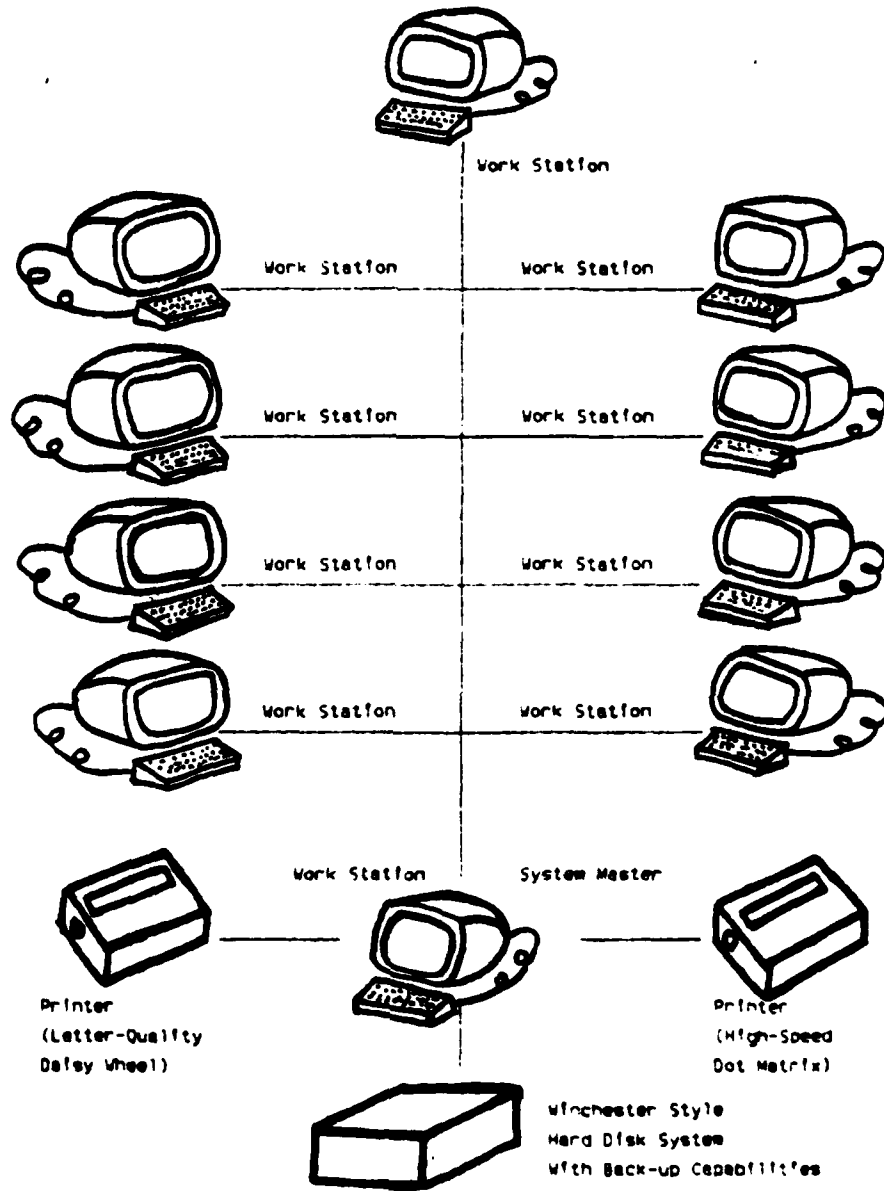


Figure 20

Figure 21 shows the present floor plan currently in existence in the Technical Branch, code 9142, at FMSO. This is the office into which the system is to be installed. Figure 22 shows a proposed floor plan. The proposed system would allow the immediate first Line Supervisor, who is a working floor supervisor, to have a work station on his/her desk. Access to the data for management purposes by the second Line Supervisor would be through the branch secretary's work station.

This network allows for 128 work stations (eight master stations each handling up to sixteen user stations). At present, only approximately 13 devices are currently planned to be attached. Follow on applications could be considered for the adjoining offices in the same physical locality and within the same branch (i.e. codes 9141, 91422 and 9143).

#### **D. COST OF PROPOSED SYSTEM**

Table 4 contains the list of system components, the quantity and total costs. Development time of the necessary databases and initial application programs will be done as a part of a follow on thesis that will explore the questions concerning database management and network control.

Present Office Floor Plan (Code 91423)

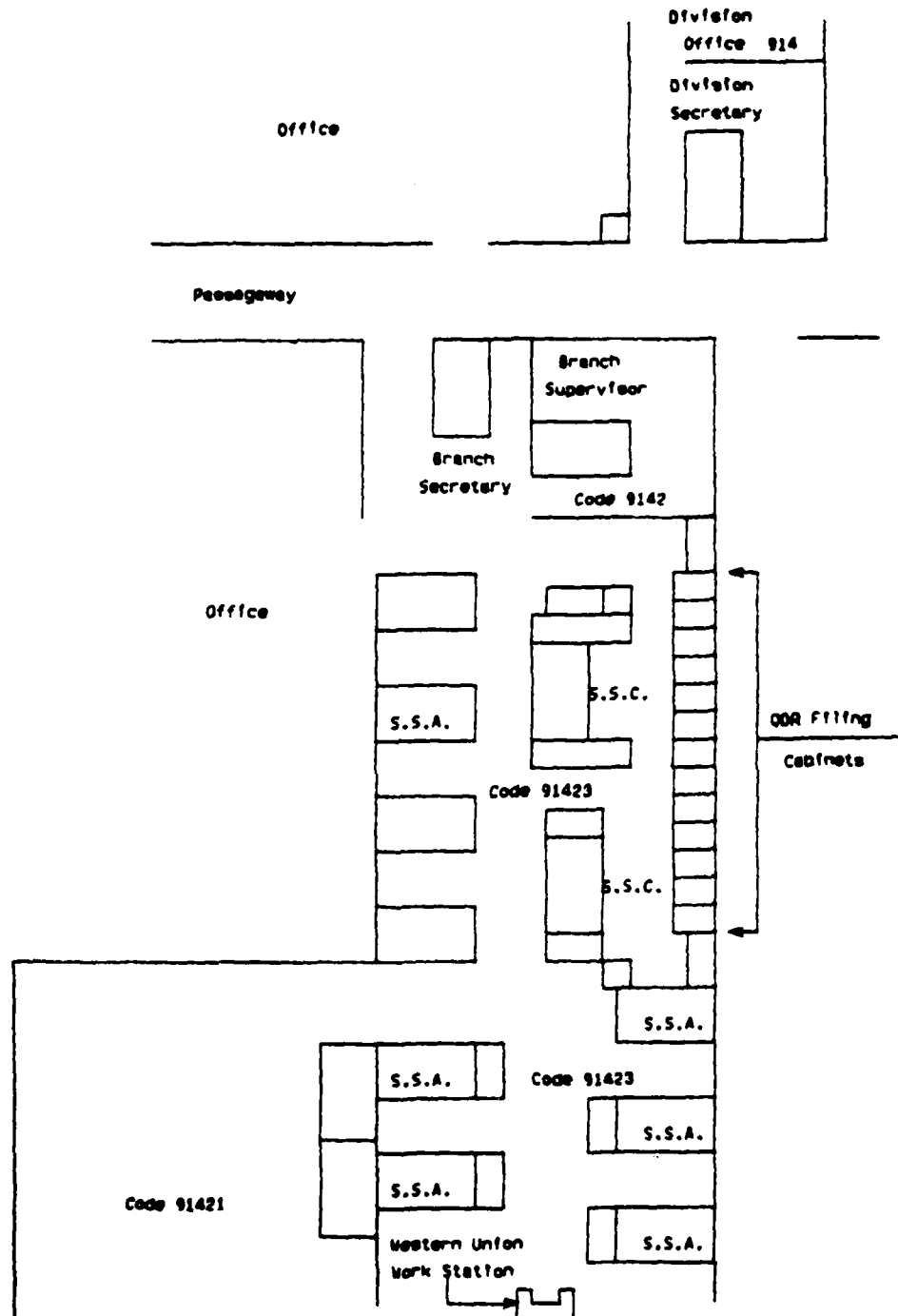


Figure 21

### Proposed Office Floor Plan With Network Installed

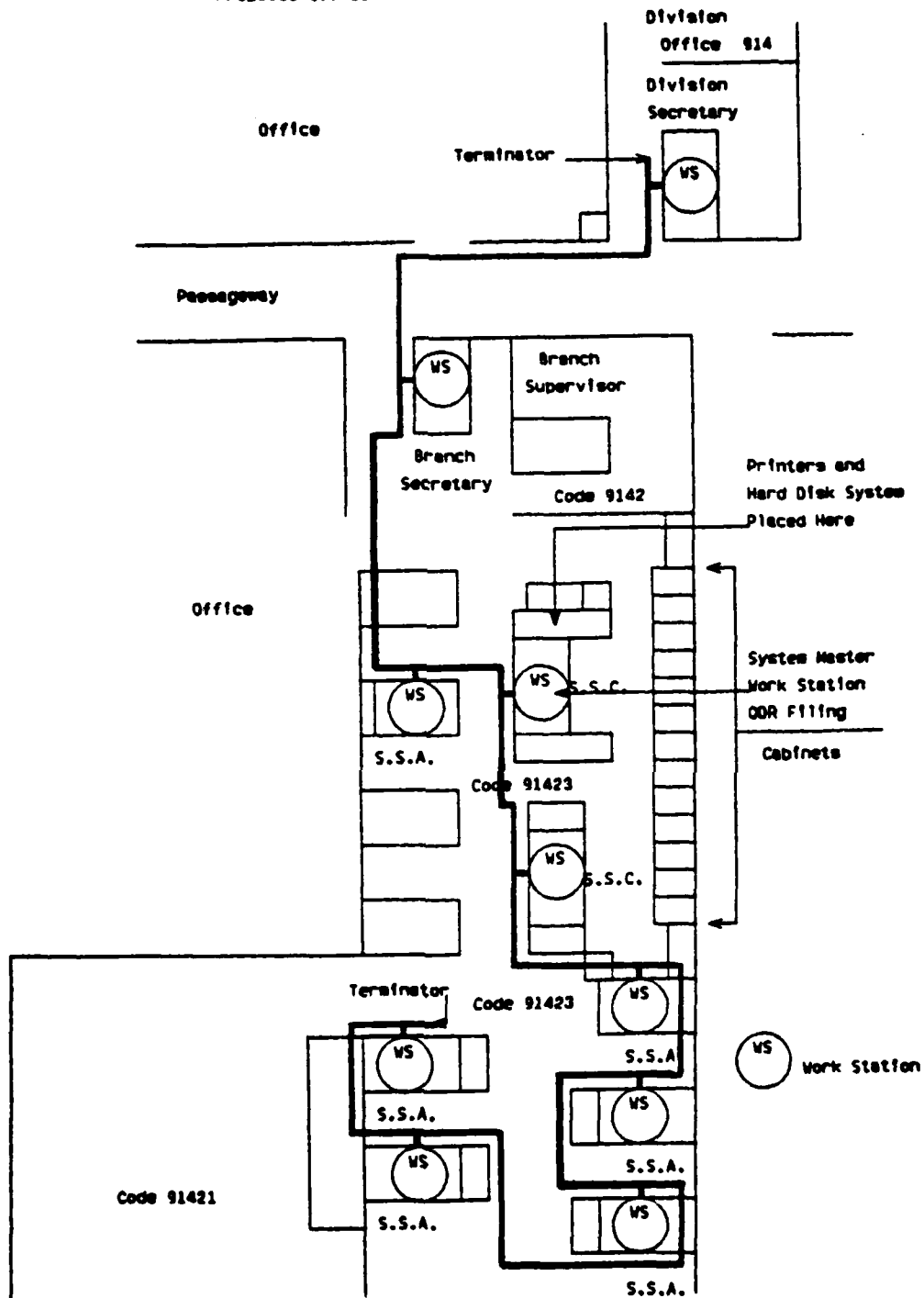


Figure 22

By using this system as a research tool and prototyping the installation, additional costs savings will be realized in the process.

Training costs are being offset by having placed an IBM PC with limited database in the office for personnel to experience and experiment with as time permits. Having this system physically in the office allows the personnel to become familiar with it and helps to reinforce the change process over time.

**TABLE 4**  
**COMPONENTS LIST OF PROPOSED AUTOMATED SYSTEM**

<u>QTY</u>	<u>DESCRIPTION</u>	<u>PRICE*</u>
10	IBM P.C. w/2 320Kb Disk Drives	\$18,430
10	Color/Graphics Adapter	\$ 1,710
10	Color/Graphics Monitors	\$ 4,760
8	PCnet Network Adapter Card	\$ 5,560
1	PCnet Starter Kit	\$ 1,490
400 ft	PCnet Finished Cable - RG59B/U Coax	\$ 200
1	Tri Hex Tool (To put coax together)	\$ 200
1	Model 20 N/M Omninet Disk System w/built-in MIRROR	\$ 4,068
1	Disk Server for IBM P.C.	\$ 891
1	Okidata 93 Printer	\$ 900
1	Diablo 630 Printer w/keyboard	\$ 2,400
1	Panasonic N.V. 8200 Video Recorder	\$ 1,178
<b>TOTAL</b>		<b>\$43,787</b>

\*Prices based on current GSA contracts with the manufacturing/retail companies.

## **E. ADDITIONAL MANAGEMENT CONSIDERATIONS**

A certain compatibility and flexibility on the part of the user is assumed in any recommendation for a new system. However, as Machiavelli observed in 1513:

"There is nothing more difficult to plan, more doubtful of success, nor more dangerous to manage than the creation of a new system. For the initiator has the enmity of all who would profit by the preservation of the old system and merely lukewarm defenders in those who would gain by the new one."

Beer [Ref 1: pp. 102-103] identifies some problems in the area of change. He states:

"As people begin to engage in the change activities and the magnitude of the emotional and material investment required are first realized, motivation and enthusiasm for the change will be significantly reduced. For the first time, people in the organization may realize that certain present satisfactions, such as the pleasure of pursuing old goals or behaving in accustomed ways, will have to be given up if new performance levels are to be accomplished.

"There are typically four areas in which organizational members may experience losses due to change:

### **"1. Loss of competence.**

Most changes place demands on organizational members for new attitudes, skills, and behavior as former ways of doing things must be discarded. The sense of competence which comes from successful performance of old roles is diminished before insecurity and threat associated with new role demands can be overcome.

### **"2. Loss of relationships.**

Organizational changes typically mean new interaction patterns as people are reassigned or new settings for decision making are created. The loss of familiar and valued relationships and the energy required to work out new ones is experienced as a cost of change by those affected. At the plant level, the introduction of autonomous work teams typically results in the creation of new relationships, as does the introduction of project or business teams when an organization moves to matrix.

**"3. Loss of power.**

There are few organizational changes that do not result in a shift in power and influence. Some parts of the organization and some role incumbents gain power while others lose it. For example, creating more challenging jobs on the shop floor reduces the traditional power of the first line supervisor and usually results in resistance to change.

**"4. Loss of extrinsic rewards.**

Organizational changes result in increased compensation and perquisites (offices, cars, parking spaces, etc.) for some. Others may lose rewards or see fewer opportunities for a significant increase in them in the future.

"As organizational members come face to face with these changes in their psychological contract they begin to lose motivation to change, motivation which may have been high in the planning stages. Organization inertia is intensified."

The ability to introduce change and have it accepted is probably the most challenging aspect of a system developer. Therefore, this study was approached from the standpoint of having to deal with any aspect of resistance to change and how to handle the resistance in a positive, productive manner.

Since the introduction of change can be seen also as a process of managing conflict, it was decided to use Brown's conflict management intervention strategies. Brown [Ref 2: pp 302-306] categorizes conflict management interventions into four categories:

**1. Redirect behavior.**

This includes "redefining issues, raising alternative solutions, altering patterns of communication between the parties, or revising the immediate behavior of representatives."

## **2. Reframe perspectives.**

Reframing perspectives includes "reformulating party interests, altering unrealistic stereotypes, changing perspectives on the situation, and educating parties about the dynamics of conflict."

## **3. Reallocate resources.**

Here Brown suggests changing "the character of the interdependence among the parties, or alter the resources available for managing conflict."

## **4. Realign underlying structural forces.**

This is the process of "redefining boundaries, altering their permeability, revising formal rules and procedures, renegotiating informal norms and values, and refocusing organizational incentives that influence conflict."

Brown further offers some rules of thumb by which to manage conflict by intervention:

"1. Choose target dynamics on the basis of (1) their centrality to conflict problems and (2) the risks and benefits of intervention.

"2. Combine intervenors to develop access, credibility, and resources appropriate to target dynamics and interventions.

"3. Combine interventions simultaneously or in sequence to fit the resources of intervenors and the demands of the situation.

"4. Use the self-reinforcing quality of conflict dynamics to (1) interrupt patterns of representative interaction, (2) redefine and reorganize interface interdependent representative interactions and interface developments." [Ref 3: pp. 317-324]

In addition to this approach, a series of meetings were scheduled to allow personnel the opportunity to react to ideas and discuss proposed changes. This approach adds depth to the main methodology. It allows a feeling of participation, a greater degree of emotional commitment to the project by personnel who otherwise could feel alienated and decreases their resistance to the change.

Often overlooked when change has been introduced is the follow-up. Beers states:

"Follow-up is the key to sustaining motivation, developing emotional support for managers and change agents, linking, and developing competence. The importance of follow-up is supported by research which demonstrates that consultant involvement before and after team-building interventions was associated with greater effectiveness when compared to team-building interventions in which there was little consultant involvement (Friedlander, 1968). Similarly, Frohman (1970) reports that consultant help and guidance increased the effectiveness of survey feedback interventions.

"While it's not clear from these reports what the consultants did, it is likely that they helped people develop competence needed to move change along, brought people and groups together, helped the client to review progress, provided emotional support, and in general served as a symbol and prod for change. There is no one way to follow-up. By definition, follow-up activities are organic and can only be planned in response to events as they develop. What can be specified are the managerial structures and processes that have been found useful in planning and ensuring follow-up (Beckhard & Harris, 1977)." [Ref 4: pp. 103]

It was because of these assumptions a prototype approach was decided upon. This approach allows for the greatest degree of flexibility in the

introduction of change. At every stage of the process, the necessary supports for reinforcement are present and the total change occurs piece by piece rather than in the form of what Gall [Ref 5: pp. 20] refers to as a Climax Design, in which the largest most complex system is introduced all at once. This type of approach generally produces systems that exhibit unexpected behavior leading to resistance. As a result, the system suffers.

## **VII. CONCLUSIONS AND RECOMMENDATIONS**

### **A. CONCLUSIONS**

The analysis of a small office's work flow within a larger organizational setting has been presented in this study. From this analysis, the following conclusions have been drawn:

1. The adaption of a new manual flow process has been shown to be a viable alternative to full automation.

2. The work load of the office is increasing at an average annual rate of over 51%.

3. Because this trend shows indications of continuing upward rather than leveling off or decreasing, the manual processing of the workload will continue to be a problem in the foreseeable future.

4. It is apparent that a fully automated system is the best viable alternative to meet the needed increase in productivity in the coming years.

### **B. RECOMMENDATIONS**

1. That the work flow for the Defective Material Section (code 91423) be fully automated.

2. That the Supply System Analysts be provided with a specific set of job standards and performance incentives.

3. That a GS 5-7-9 training program be established to train future Supply System Analysts.

## APPENDIX A

This appendix contains complete module listings and data base files of version 1.0 of the Interim Database Management System. The modules are arranged in logical order of their position within the structured hierarchy. Included herein also is a general lower level module stub used to aid in the development of a higher level module.

MAIN MODULE (MAIN.PRG)

```
ERASE
SET TALK OFF
SET COLON OFF
USE QDR
@ 5, 10 SAY "This will take awhile."
@ 10, 10 SAY "Please be patient."
@ 15, 10 SAY "I will let you know when I'm done."
DO CNTR
ERASE
@ 5, 10 SAY "I'm back. Everything is counted now."
  @ 10, 10 SAY "Shall we continue (Y or N)?"
STORE 1 TO X
DO WHILE X < 250
  STORE X + 1 TO X
ENDDO Pause
DO Menu
```

**COUNT MODULE (CNTR. PRG)**

```
STORE 0 TO Mtotal
STORE 0 TO Mwork
STORE 0 TO Mawtg
STORE 0 TO Mjob
STORE 0 TO Mprocess
STORE 0 TO Mcat0
STORE 0 TO Mcat1
STORE 0 TO Mcat2
STORE 0 TO Mresponse
STORE 0 TO Mcloseout
STORE 0 TO Mtime
STORE 0 TO Mcount
STORE 0 TO Mtran
STORE 0 TO Mclose
STORE 0 TO Mtech
STORE T TO Mflag
STORE " " TO Mla
STORE " " TO Mcog
```

**NOTE START OF COUNT AND UPDATE ROUTINE**

DO WHILE .NOT. EOF

**NOTE COMPUTATION OF HOW LONG A CASE AWAITS ACTUAL  
NOTE PROCESSING BY AN ANALYST**

```
IF Date:in <= 0 .AND. In:work <= 0
  SKIP
  LOOP
ELSE
  STORE Mtotal + 1 TO Mtotal
  @ 23, 10 SAY "Record being evaluated is number:";
  GET Mtotal
  STORE In:work - Date:in TO Mwork
  IF Mwork <= 0
    STORE 1 TO Mwork
  ENDIF Zero Check
  STORE Mawtg + Mwork TO Mawtg
  STORE 0 TO Mwork
ENDIF Mawtg
```

**NOTE ANALYST CODE EVALUATION SECTION**

```
STORE Tech:code TO Mtech
SELECT SECONDARY
USE B:Techcode
DO WHILE .NOT. EOF .AND. Mflag
  IF Tech = Mtech
    REPLACE Counter WITH Counter + 1
    STORE F TO Mflag
  ELSE
    SKIP
  LOOP
ENDIF Techcode
ENDDO Not EOF
IF Mflag
  APPEND BLANK
  REPLACE Tech WITH Mtech
  REPLACE Counter WITH 1
ENDIF Mflag
```

**NOTE GO BACK TO PRIMARY DATABASE FILE (QDR)**

**NOTE EVALUATE THE COG CODE OF THE CASE**

```
SELECT PRIMARY
STORE Cog TO Mcog
STORE T TO Mflag
SELECT SECONDARY
USE B:Cogcount
DO WHILE .NOT. EOF .AND. Mflag
  IF Cog = Mcog
    REPLACE Counter WITH Counter + 1
    STORE F TO Mflag
  ELSE
    SKIP
  ENDF Cog = Mcog
ENDDO Not EOF
IF Mflag
  APPEND BLANK
  REPLACE Im WITH Mim
  REPLACE Counter WITH 1
ENDIF Mflag
```

**NOTE EVALUATE THE ITEM MANAGER FIELD OF THE CASE**

```
STORE Item:mgr TO Mim
STORE T TO Mflag
```

```

SELECT SECONDARY
USE B:Imcount
DO WHILE .NOT. EOF .AND. Mflag
  IF Im = Mia
    REPLACE Counter WITH Counter + 1
    STORE F TO Mflag
  ELSE
    SKIP
  ENDIF Im is Mia
ENDDO Not EOF
IF Mflag
  APPEND BLANK
  REPLACE Im WITH Mia
  REPLACE Counter WITH 1
ENDIF Mflag

```

NOTE RETURN TO THE PRIMARY DATABASE FILE (QDR)  
 NOTE CHECK THE CASE FOR THE CATEGORY AND ERROR TRAP  
 NOTE WRONG CATEGORY CODES

```

SELECT PRIMARY
IF Category = "1"
  STORE Mcat1 + 1 TO Mcat1
ELSE
  IF Category = "2"
    STORE Mcat2 + 1 TO Mcat2
  ELSE
    STORE Mcat0 + 1 TO Mcat0
  ENDIF Cat2
ENDIF Cat1

```

NOTE EVALUATE THE ACTUAL TIME IT TOOK TO GET THE  
 NOTE CASE PROCESSED IN THE OFFICE AND OUT TO THE  
 NOTE ITEM MANAGER (INITIAL PROCESSING TURN AROUND  
 NOTE TIME)

```

IF Transmit <= 0
  SKIP
  LOOP
ELSE
  STORE Mtran + 1 TO Mtran
  STORE Transmit - In:work TO Mwork
  IF Mwork <= 0
    STORE 1 TO Mwork
  ENDIF Zero Check
  STORE Mjob + Mwork TO Mjob
  STORE 0 TO Mwork

```

NOTE EVALUATION OF ACTUAL TURN AROUND TIME FROM  
NOTE ARRIVAL TO TRANSMITTAL OF CASE

```
STORE Transmit - Date:in TO Mwork
IF Mwork <= 0
  STORE 1 TO Mwork
ENDIF Zero Check
STORE Mprocess + Mwork TO Mprocess
STORE 0 TO Mwork
ENDIF Transmit Check
```

NOTE EVALUATION PROCESS AS TO HOW LONG IT TAKES THE  
NOTE ITEM MANAGER TO PROCESS A CASE AND RETURN IT TO  
NOTE FMSO FOR CLOSE OUT ACTIONS

```
IF Response <= 0
  SKIP
  LOOP
ELSE
  STORE Mcount + 1 TO Mcount
  STORE Response - Transmit TO Mwork
  IF Mwork <= 0
    STORE 1 TO Mwork
  ENDIF Zero Check
  STORE Mresponse + Mwork TO Mresponse
  STORE 0 TO Mwork
ENDIF Response Check
```

NOTE EVALUATION OF HOW LONG IT TAKES FMSO TO CLOSE  
NOTE A CASE OUT AFTER RECEIPT BACK FROM THE ITEM  
NOTE MANAGER

```
IF Closeout <= 0
  SKIP
  LOOP
ELSE
  STORE Mclose + 1 TO Mclose
  STORE Closeout - Response TO Mwork
  IF Mwork <= 0
    STORE 1 TO Mwork
  ENDIF Zero Check
  STORE Mcloseout + Mwork TO Mcloseout
  STORE 0 TO Mwork
```

NOTE EVALUATION AS TO HOW LONG IT TOOK TO PROCESS  
NOTE THE CASE FROM ARRIVAL FMSO UNTIL IT WAS CLOSED  
NOTE OUT AND DISPOSITION INSTRUCTIONS ISSUED

```
STORE Closeout - Date:in TO Mwork
IF Mwork <= 0
  STORE 1 TO Mwork
ENDIF Zero Check
STORE Mtime + Mwork TO Mtime
STORE 0 TO Mwork
ENDIF Closeout Check
SKIP
ENDDO Count
```

NOTE STATISTICS FROM THE DATABASE ARE CAPTURED AND  
NOTE STORED TO DISK TO CREATE A DYNAMIC ON GOING  
NOTE PROCESS TO ELIMINATE THE TIME CONSUMING PROCESS  
NOTE OF COUNTING EVERY RECORD WHENEVER A REPORT IS  
NOTE NEEDED

```
USE B:QDRSTATS
REPLACE Total WITH Mtotal + Total
REPLACE Awtg WITH Mawtg + Awtg
REPLACE Job WITH Mjob + Job
REPLACE Process WITH Mprocess + Process
REPLACE Cat0 WITH Mcat0 + Cat0
REPLACE Cat1 WITH Mcat1 + Cat1
REPLACE Cat2 WITH Mcat2 + Cat2
REPLACE Response WITH Mresponse + Response
REPLACE Closeout WITH Mcloseout + Closeout
REPLACE Time WITH Mtime + Time
REPLACE Counter WITH Mcount + Counter
REPLACE Tran WITH Mtran + Tran
REPLACE Closed WITH Mclosed + Closed
SELECT PRIMARY
RETURN
```

MENU MODULE (MENU.PRG)

STORE T TO Continue  
STORE " " TO Reply  
SET TALK OFF  
SET COLON OFF

DO WHILE Continue

ERASE

@ 4, 35 SAY "MAIN MENU"

@ 6, 19 SAY "Select and enter the number of your";  
"choice:"

@ 8, 21 SAY "1. APPEND Records"

@ 9, 21 SAY "2. EDIT Records"

@ 11, 21 SAY "3. Produce Turn Around Time Report."

@ 12, 21 SAY "4. Produce System Analyst Case";  
"Load Report."

@ 13, 21 SAY "5. Produce Complete Management";  
"Report."

@ 15, 21 SAY "6. Quit dBase II Program."

READ

DO CASE

CASE REPLY = "1"

DO ADDREC

CASE REPLY = "2"

DO QDREDIT

CASE REPLY = "3"

DO TAT

CASE REPLY = "4"

DO CASELOAD

CASE REPLY = "5"

DO MGR

CASE REPLY = "6"

QUIT

OTHERWISE

LOOP

ENDCASE Reply

ENDDO Continue

GENERAL MODULE STUB

```
STORE T TO Ccontinue
DO WHILE Continue
  ERASE
  @ 5, 10 SAY "This is ----"
  @ 10, 10 SAY "Shall we continue (Y or N)?"
  WAIT to Output
  IF !(Output) = 'Y'
    STORE F TO Continue
  ELSE
    LOOP
  ENDIF Ooutput Check
ENDDO Continue
RETURN
```

# RECORD EDITING MODULE (QDREDIT.PRQ)

```

SELECT PRIMARY
USE B:Qdr INDEX B:Cases
STORE T TO Mflag1
STORE T TO Mflag2
DO WHILE Mflag1
  ERASE
  STORE " " TO Mcasenr
  DO WHILE Mflag2
    @ 20, 20 SAY "ENTER CASE NUMBER: ";
    GET Mcasenr PICTURE "XXXXXXXXXX"

    READ
    IF Mcasenr = " "
      STORE F TO Mflag1
      STORE F TO Mflag2
      LOOP
    ENDIF Blank case number
    FIND &Mcasenr
    IF # = 0
      @ 22, 20 SAY "CASE NOT FOUND, PLEASE REENTER"
    ELSE
      STORE F TO Mflag2
    ENDIF Record not found
  ENDDO Mflag2
  IF .NOT. Mflag1
    LOOP
  ENDIF Mflag1
  STORE Date:in TO Cdate:in
  STORE In:work TO Cin:work
  STORE Case:nr TO Ccase:nr
  STORE Cog TO Ccog
  STORE Tech:code TO Ctech:code
  STORE Item:mgr TO Citem:mgr
  STORE Category TO Ccategory
  STORE Transmit TO Ctransmit
  STORE Response TO Cresponse
  STORE Closeout TO Ccloseout
  ERASE
  @ 10, 5 SAY "DATE:IN " GET DATE:IN PICTURE "9999"
  @ 11, 5 SAY "IN:WORK " GET IN:WORK PICTURE "9999"
  @ 12, 5 SAY "CASE:NR " GET CASE:NR PICTURE;
    "XXXXXXXXXX"
  @ 13, 5 SAY "COG " GET COG PICTURE "XX"
  @ 14, 5 SAY "TECH:CODE " GET TECH:CODE PICTURE;
    "99"

```

```

@ 15, 5 SAY "ITEM:MGR " GET ITEM:MGR PICTURE:
      "XXXX"
@ 16, 5 SAY "CATEGORY " GET CATEGORY PICTURE "X"
@ 17, 5 SAY "TRANSMIT " GET TRANSMIT PICTURE;
      "9999"
@ 18, 5 SAY "RESPONSE " GET RESPONSE PICTURE:
      "9999"
@ 19, 5 SAY "CLOSEOUT " GET CLOSEOUT PICTURE;
      "9999"

READ
IF P.COG <> CCOG
  SELECT SECONDARY
  USE B:COGCOUNT
  STORE T TO Mflag
  STORE O TO Mcounter
  DO WHILE .NOT. EOF .AND. Mflag
    IF CCOG = COG
      REPLACE Counter WITH Counter - 1
      STORE Mcounter + 1 TO Mcounter
    ELSE
      IF P.COG = S.COG
        REPLACE Counter WITH Counter + 1
        STORE Mcounter + 1 TO Mcounter
      ENDIF P = S
    ENDIF CCOG = COG
    IF Mcounter = 2
      STORE F TO Mflag
    ENDIF Mcounter = 2
    SKIP
  ENDDO NOT EOF
  IF Mflag
    APPEND BLANK
    REPLACE S.COG WITH P.COG
    REPLACE Counter WITH 1
  ENDIF Mflag
ENDIF <>
IF P.TECH:CODE <> CTECH:CODE
  SELECT SECONDARY
  USE B:Techcode
  STORE T TO Mflag
  STORE O TO Mcounter
  DO WHILE .NOT. EOF .AND. Mflag
    IF CTECH:CODE = TECH
      REPLACE Counter WITH Counter + 1
      STORE Mcounter + 1 TO Mcounter
    ELSE
      IF TECH = TECH:CODE
        REPLACE Counter WITH Counter + 1

```

```

        STORE Mcounter + 1 TO Mcounter
    ENDIF S = P
ENDIF CTECH:CODE = TECH
IF Mcounter = 2
    STORE F TO Mflag
ENDIF Mflag
SKIP
ENDDO While Not EOF
IF Mflag
    APPEND BLANK
    REPLACE TECH WITH TECH:CODE
ENDIF Mflag
ENDIF TECH:CODE
IF P.ITEM:MGR <> CITEM:MGR
    SELECT SECONDARY
    USE B:Imcount
    STORE T TO Mflag
    STORE 0 TO Mcounter
    DO WHILE .NOT. EOF .AND. Mflag
        IF CITEM:MGR = IM
            REPLACE Counter WITH Counter - 1
            STORE Mcounter + 1 TO Mcounter
        ELSE
            IF IM = ITEM:MGR
                REPLACE Counter WITH Counter - 1
                STORE Mcounter + 1 TO Mcounter
            ENDIF IM = ITEM:MGR
        ENDIF CITEM:MGR = IM
        IF Mcounter = 2
            STORE F TO Mflag
        ENDIF Mcounter = 2
        SKIP
    ENDDO Not EOF
    IF Mflag
        APPEND BLANK
        REPLACE IM WITH ITEM:MGR
        REPLACE Counter WITH 1
    ENDIF Mflag
ENDIF <>
SELECT SECONDARY
USE B:B Qdrstata
IF CRESPONSE <> 0 .AND. P.RESPONSE = 0
    REPLACE Counter WITH Counter - 1
ELSE
    IF CRESPONSE = 0 .AND. P.RESPONSE > 0
        REPLACE Counter WITH Counter + 1
    ENDIF
ENDIF Counter
IF CTRANSMIT <> 0 .AND. P.TRANSMIT = 0

```

```

REPLACE Tran WITH Tran - 1
ELSE
  IF CTRANSMIT = 0 .AND. P.TRANSMIT = 0
    REPLACE Tran WITH Tran + 1
  ENDIF
ENDIF Tran
IF CCLOSEOUT <> 0 .AND. P.CLOSEOUT = 0
  REPLACE Closed WITH Closed - 1
ELSE
  IF CCLOSEOUT = 0 .AND. P.CLOSEOUT > 0
    REPLACE Closed WITH Closed + 1
  ENDIF
ENDIF Closed
IF P.CATEGORY <> CCATEGORY
  DO CASE
    CASE CCATEGORY = "1"
      REPLACE Cat1 WITH Cat1 - 1
    CASE CCATEGORY = "2"
      REPLACE Cat2 WITH Cat2 - 1
    OTHERWISE
      REPLACE Cat0 WITH Cat0 - 1
  ENDCASE
  DO CASE
    CASE CATEGORY = "1"
      REPLACE Cat1 WITH Cat1 + 1
    CASE CATEGORY = "2"
      REPLACE Cat2 WITH Cat2 + 1
    OTHERWISE
      REPLACE Cat0 WITH Cat0 + 1
  ENDCASE
ENDIF CATEGORY <>
STORE CIN:WORK - CDATE:IN TO Cawtg
STORE CTRANSMIT - CIN:WORK TO Cjob
STORE CTRANSMIT - CDATE:IN TO Cprocess
STORE CCLOSEOUT - CRESPONSE TO Cclosed
STORE CRESPONSE - CTRANSMIT TO Cresponse
STORE CCLOSEOUT - CDATE:IN TO Ctime
STORE IN:WORK - DATE:IN TO Mawtg
STORE TRANSMIT - IN:WORK TO Mjob
STORE TRANSMIT - DATE:IN TO Mprocess
STORE RESPONSE - TRANSMIT TO Mresponse
STORE CLOSEOUT - RESPONSE TO Mcloseout
STORE CLOSEOUT - DATE:IN TO Mtime
IF Cawtg = 0
  STORE 1 TO Cawtg
ELSE
  IF Cawtg < 0
    STORE 0 TO Cawtg
  ENDIF < 0

```

```

ENDIF Cawtg = 0
IF Cjob = 0
    STORE 1 TO Cjob
ELSE
    IF Cjob < 0
        STORE 0 TO Cjob
    ENDIF < 0
ENDIF Cjob = 0
IF Cprocess = 0
    STORE 1 TO Cprocess
ELSE
    IF Cprocess < 0
        STORE 0 TO Cprocess
    ENDIF Cprocess < 0
ENDIF Cprocess = 0
IF Cclosed = 0
    STORE 1 TO Cclosed
ELSE
    IF Cclosed < 0
        STORE 0 TO Cclosed
    ENDIF Cclosed < 0
ENDIF Cclosed = 0
IF Cresponse = 0
    STORE 1 TO Cresponse
ELSE
    IF Cresponse < 0
        STORE 0 TO Cresponse
    ENDIF Cresponse < 0
ENDIF Cresponse = 0
IF Ctime = 0
    STORE 1 TO Ctime
ELSE
    IF Ctime < 0
        STORE 0 TO Ctime
    ENDIF Ctime < 0
ENDIF Ctime = 0
IF Mawtg = 0
    STORE 1 TO Mawtg
ELSE
    IF Mawtg < 0
        STORE 0 TO Mawtg
    ENDIF Mawtg < 0
ENDIF Mawtg = 0
IF Mjob = 0
    STORE 1 TO Mjob
ELSE
    IF Mjob < 0
        STORE 0 TO Mjob
    ENDIF Mjob < 0

```

```

ENDIF Mjob = 0
IF Mprocess = 0
  STORE 1 TO Mprocess
ELSE
  IF Mprocess < 0
    STORE 0 TO Mprocess
  ENDIF Mprocess < 0
ENDIF Mprocess = 0
IF Mresponse = 0
  STORE 1 TO Mresponse
ELSE
  IF Mresponse < 0
    STORE 0 TO Mresponse
  ENDIF Mresponse < 0
ENDIF Mresponse = 0
IF Mcloseout = 0
  STORE 1 TO Mcloseout
ELSE
  IF Mcloseout < 0
    STORE 0 TO Mcloseout
  ENDIF Mcloseout < 0
ENDIF Mcloseout = 0
IF Mtime = 0
  STORE 1 TO Mtime
ELSE
  IF Mtime < 0
    STORE 0 TO Mtime
  ENDIF Mtime < 0
ENDIF Mtime = 0
REPLACE Awtg WITH Awtg + Mawtg - Cawtg
REPLACE Job WITH Job + Mjob - Cjob
REPLACE Process WITH Process + Mprocess - Cprocess
REPLACE Response WITH Response + Mresponse -
Cresponse
REPLACE Closeout WITH Closeout + Mcloseout -
Ccloseout
REPLACE Time WITH Time + Mtime - Ctime
STORE T TO Mflag2
SELECT PRIMARY
ENDDO Mflag1
RETURN

```

TURN AROUND TIME MODULE (TAT.PRG)

```
SELECT SECONDARY
USE B:Qdrstats
STORE Process/Total * 1.00 TO Mtat
STORE Awtg/Tran * 1.00 TO Maapt
STORE Job/Total * 1.00 TO Mapt
STORE Response/Counter * 1.00 TO Mmr
STORE Closeout/Closed * 1.00 TO Mcot
STORE Time/Counter * 1.00 TO Mtime
STORE T TO Crt
STORE T TO Continue

DO WHILE Continue
  ERASE
  @ 5, 10 SAY "Do you want a printed report "+;
    "(Y or N)?" GET Reply PICTURE "X"
  READ
  DO CASE
    CASE !(Reply) = "Y"
      ERASE
      SET PRINT ON
      SET SCREEN OFF
      SET FORMAT TO PRINT
      STORE F TO Crt
      STORE F TO Continue
    CASE !(Reply) = "N"
      STORE F TO Continue
    OTHERWISE
      LOOP
  ENDCASE Optional print
ENDDO Continue
ERASE
@ 5, 21 SAY "TURN AROUND TIME REPORT FOR CODE";
  "91423"
@ 7, 10 SAY "The average turn around time to "+;
  "date is. . . . . "+STR(Mtat,6,2)
@ 8, 10 SAY "The average awaiting process time "+;
  "is . . . . . "+STR(Maapt,6,2)
@ 9, 10 SAY "The average processing time "+;
  "is . . . . . "+STR(Mapt,6,2)
@ 10, 10 SAY "The average time awaiting item "+;
  "manager response is "+STR(Mmr,6,2)
@ 11, 10 SAY "The average time to close out a "+;
  "case is. . . . . "+STR(Mcot,6,2)
@ 13, 10 SAY "The average turn around time of "+;
  "a case from"
```

```

@ 14, 10 SAY "arrival at FMSO to final close "+;
      "out is. . . . . "+STR(Mtime,6,2)
@ 16, 10 SAY "The total number of cases in the "+;
      "database is . . . "+STR(Total,6,0)
@ 17, 10 SAY "The total number of cases sent to "+;
      "item managers is "+STR(Tran,6,0)
@ 18, 10 SAY "The total cases responded to by "+;
      "item managers is "+STR(Counter,6,0)
@ 19, 10 SAY "The total cases closed out to "+;
      "date are . . . . . "+STR(Closed,6,0)
STORE T TO Continue
DO WHILE Continue
  IF Crt = T
    @ 22, 10 SAY "Do you wish to continue "+;
      "(Y or N)?" GET Reply PICTURE "X"

    READ
    IF !(Reply) = "Y"
      SELECT PRIMARY
      DO Menu
    ELSE
      LOOP
    ENDIF Reply
  ELSE
    EJECT
    SET PRINT OFF
    SET SCREEN ON
    SET FORMAT TO SCREEN
  ENDIF Crt
  @ 15, 10 SAY "Do you wish to continue "+;
    "(Y or N)?" GET Reply PICTURE "X"

  READ
  IF !(Reply) = "Y"
    SELECT PRIMARY
    DO Menu
  ELSE
    LOOP
  ENDIF Reply
ENDDO Continue

```

SYSTEM ANALYST CASE LOAD MODULE (CASELOAD.PRG)

STORE T TO Crt  
STORE T TO Continue  
STORE O TO Mpc  
STORE O TO Mac1  
STORE O TO Manal  
STORE " " TO Reply

SELECT SECONDARY

USE B:Qdrstats

ERASE

@ 8, 10 SAY "How many analyst are currently "+;  
"assigned? " GET Manal PICTURE "9"

@ 10, 10 SAY "Do you want a printed report "+;  
"Y or N)? " GET Reply PICTURE "X"

READ

STORE Total/Manal \* 1.00 TO Mac1

DO WHILE Continue

ERASE

DO CASE

CASE !(Reply) = "Y"

ERASE

SET PRINT ON

SET SCREEN OFF

SET FORMAT TO PRINT

STORE F TO Crt

STORE F TO Continue

CASE !(Reply) = "N"

STORE F TO Continue

OTHERWISE

LOOP

ENDCASE Optional print

ENDDO Continue

ERASE

@ 5, 23 SAY "SUPPLY SYSTEM ANALYST CASE LOAD REPORT"

SELECT PRIMARY

USE B:Qdrstats

SELECT SECONDARY

USE B:Techcode

SORT ON Tech TO B:Sortfile

SELECT SECONDARY

USE B:Sortfile

STORE 7 TO Mentr

DO WHILE .NOT. EOF .AND. Mentr < 24

```

STORE Mcntr + 1 TO Mcntr
STORE Counter/Total * 100.00 TO Mpc
@ Mcntr, 10 SAY "Total cases processed to date "+;
    "by analyst "+STR(Tech,2,0)+": "+;
    STR(Counter,6,0)+" "+STR(Mpc,5,2)+"%"
SKIP
ENDDO While not EOF and Mcntr < 24

@ Mcntr+3, 29 SAY "The analyst case load is: ";
    +STR(Macl,7,2)
STORE T TO Continue

DO WHILE Continue
    IF Crt = T
        @ 22, 10 SAY "Do you wish to continue (Y or N)?"
        GET Reply PICTURE "X"

        READ
        IF !(Reply) = "Y"
            SELECT PRIMARY
            DO Menu
        ELSE
            LOOP
        ENDIF Reply
    ELSE
        EJECT
        SET PRINT OFF
        SET SCREEN ON
        SET FORMAT TO SCREEN
    ENDIF Crt
    @ 15, 10 SAY "Do you wish to continue (Y or N)?"
    GET Reply PICTURE "X"

    READ
    IF !(Reply) = "Y"
        SELECT PRIMARY
        DO Menu
    ELSE
        LOOP
    ENDIF Reply
ENDDO Continue

```

**COMPLETE MANAGEMENT REPORT MODULE (MGR. PRG)**

SELECT SECONDARY

USE B:Qdrstata

STORE Process/Total \* 1.00 TO Mtat

STORE Awtg/Tran \* 1.00 TO Maapt

STORE Job/Total \* 1.00 TO Mapt

STORE Response/Counter \* 1.00 TO Miar

STORE Closeout/Closed \* 1.00 TO Mcot

STORE Time/Counter \* 1.00 TO Mtime

STORE Total - Tran TO Mtoh

STORE Counter - Closed TO Mtip

STORE Tran - Counter TO Mso

STORE 0 TO Mpc

STORE 0 TO Manal

STORE Total/Manal \* 1.00 TO Mac1

STORE " " TO Reply

STORE T TO Crt

STORE T TO Continue

DO WHILE Continue

ERASE

@ 12, 10 SAY "Do you want a printed report "+;  
"(Y or N)? " GET Reply PICTURE "X"

@ 14, 10 SAY "How many analyst are currently "+;  
"assigned? " GET Manal PICTURE "9"

READ

DO CASE

CASE !(Reply) = "Y"

ERASE

SET PRINT ON

SET SCREEN OFF

SET FORMAT TO PRINT

STORE F TO Crt

STORE F TO Continue

STORE 5 TO Mcnt

CASE !(Reply) = "N"

STORE F TO Continue

STORE 1 TO Mcnt

OTHERWISE

LOOP

ENDCASE Optional print

ERASE

@ Mcnt, 21 SAY "MANAGEMENT REPORT ON CODE  
91423"

```

@ Mcnt+2, 21 SAY "*** AVERAGE PROCESSING
TIMES ***"
@ Mcnt+3, 5 SAY "The average initial turn "+;
"around time is . . . . . ";
+STR(Mtat,6,2)
@ Mcnt+4, 5 SAY "The average awaiting process "+;
"time is. . . . . "+;
STR(Maapt,6,2)
@ Mcnt+5, 5 SAY "The average processing time "+;
"is. . . . . "+;
STR(Mapt,6,2)
@ Mcnt+6, 5 SAY "The average time awaiting "+;
"manager response is. . . "+;
STR(Mimr,6,2)
@ Mcnt+7, 5 SAY "The average time to close out "+;
"a case is . . . . . "+;
STR(Mcot,6,2)
@ Mcnt+9, 5 SAY "The average turn around time "+;
"of a case from"
@ Mcnt+10, 5 SAY "arrival at FMSO to final "+;
"close out is . . . . . "+;
STR(Mtime,6,2)

@ Mcnt+12,21 SAY "**** QDR CASES STATUS REPORT
****"
@ Mcnt+13, 5 SAY "Total number of cases in "+;
"process. . . . . "+;
STR(Mtoh,6,0)
@ Mcnt+14, 5 SAY "Total number of cases "+;
"transmitted to item manager"+;
STR(Tran,6,0)
@ Mcnt+15, 5 SAY "Total number of cases on the"+;
"database . . . . . "+;
STR(Total,6,0)
@ Mcnt+17, 5 SAY "Total cases in close in close "+;
"out process. . . . . "+;
STR(Mtip,6,0)
@ Mcnt+18, 5 SAY "Total cases closed "+;
"out. . . . . "+;
STR(Closed,6,0)
@ Mcnt+19, 5 SAY "Total number of cases "+,
"returned from item manager. . . "+;
STR(Counter,6,0)
@ Mcnt+21, 5 SAY "Total number of cases still "+;
"out to item manager. . . "+;
STR(Mso,6,0)

```

DO WHILE Crt

```

@ 24, 10 SAY "Do a <Carriage Return> to continue"

```

```

        WAIT
        STORE F TO Crt
        STORE 0 TO Mcnt
        ERASE
    ENDDO Crt
    IF !(Reply) = "N"
        STORE T TO Crt
    ENDIF Reply

    @ Mcnt+3, 23 SAY "*** SUPPLY ANALYST CASE
LOAD ***"
    STORE Mcnt + 5 TO Mcnt
    SELECT PRIMARY
    USE B:Qdrstats
    SELECT SECONDARY
    USE B:Techcode
    SORT ON Tech TO Sortfile
    SELECT SECONDARY
    USE Sortfile

    IF Crt = T
        DO WHILE .NOT. EOF .AND. < 22
            STORE Mcnt + 1 TO Mcnt
            STORE Counter/Total * 100.00 TO Mpc
            @ Mcnt, 5 SAY "Total cases processed to "+;
                "date by analyst #"+STR(Tech,2,0)+;
                ": "+STR(Counter,6,0)+" "+;
                STR(Mpc,5,2)+"%"
            SKIP
        ENDDO Not EOF or page overflow
    ENDIF Crt

    @ Mcnt+2, 10 SAY "The average analyst total "+;
        "case load to date is: "+STR(Macl,7,2)

    IF Crt = T
        STORE 2 TO Mcnt
        @ 24, 10 SAY "Do a <Carriage Return> to continue"
        WAIT
        ERASE
    ELSE
        STORE 5 TO Mcnt
        EJECT
    ENDIF Crt

    @ Mcnt, 18 SAY "*** CASE LOAD BREAKDOWN BY
COG ***"

    SELECT SECONDARY

```

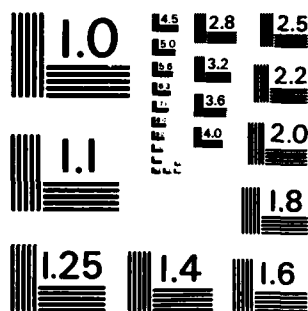
A SYSTEM ANALYSIS AND DESIGN FOR UPDATING THE INTERNAL TRACKING OF THE QU... (U) NAVAL POSTGRADUATE SCHOOL MONTEREY CA M D CARRIGER JUN 83

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MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS - 1963 - A

```

USE B: Cogcount
SORT ON Cog TO Sortcog
SELECT SECONDARY
USE Sortcog

STORE Mcnt + 3 TO Mcnt

IF Crt = T
  DO WHILE .NOT. EOF
    IF Mcnt < 22
      STORE Mcnt + 1 TO Mcnt
      @ Mcnt, 10 SAY "Total cases processed to "+;
        "date for COG "+$(COG,1,2)+"": "+;
        STR(Counter,6,0)

      SKIP
    ELSE
      STORE 2 TO Mcnt
      @ 24, 10 SAY "Do a <Carriage Return> to "+;
        "continue"

      WAIT
      ERASE
    ENDIF Screen overflow
  ENDDO Not EOF
ELSE
  DO WHILE .NOT. EOF
    IF Mcnt < 54
      STORE Mcnt + 1 TO Mcnt
      @ Mcnt, 10 SAY "Total cases processed to "+;
        "date for COG "+$(Cog,1,2)+"": "+;
        STR(Counter,6,0)

      SKIP
    ELSE
      STORE 5 TO Mcnt
      EJECT
    ENDIF Page overflow
  ENDDO Not EOF
ENDIF Crt
IF Crt = T
  STORE 2 TO Mcnt
  @ 23, 10 SAY "END OF COG REPORT"
  @ 24, 10 SAY "Do a <Carriage Return> to continue"
  WAIT
  ERASE
ELSE
  STORE 5 TO Mcnt
  EJECT
ENDIF Crt

```

```

@ Mcnt, 15 SAY "*** CASE BREAKDOWN BY ITEM
"+;
      "MANAGER ***"

SELECT SECONDARY
USE B:Imcount
SORT ON Im TO Sortim
SELECT SECONDARY
USE Sortim
STORE Mcnt + 3 TO Mcnt

IF Crt = T
  DO WHILE .NOT. EOF
    IF Mcnt < 22
      STORE Mcnt + 1 TO Mcnt
      @ Mcnt, 10 SAY "Total cases processed to "+;
        "date for "+S(Im,1,4)+"": "+;
        STR(Counter,6,0)

      SKIP
    ELSE
      STORE 2 TO Mcnt
      @ 24, 10 SAY "Do a <Carriage Return> to "+;
        "continue"

      WAIT
      ERASE
    ENDIF Screen overflow
  ENDDO Not EOF
ELSE
  DO WHILE .NOT. EOF
    IF Mcnt < 54
      STORE Mcnt + 1 TO Mcnt
      @ Mcnt, 10 SAY "Total cases processed to "+;
        date for "+S(Im,1,4)+"": "+;
        STR(Counter,6,0)

      SKIP
    ELSE
      STORE 5 TO Mcnt
      EJECT
    ENDIF Page overflow
  ENDDO Not EOF
ENDIF Crt

IF Crt = T
  STORE 2 TO Mcnt
  @ 23, 10 SAY "End of item manager report"
  @ 24, 10 SAY "Do a <Carriage Return> to continue"
  WAIT
  ERASE
ELSE

```

```

STORE 5 TO Mcnt
EJECT
ENDIF Crt

@ Mcnt, 10 SAY "The database shows a total of ";
+STR(Cat1,6,0)+" category I QDRs."
@ Mcnt+2, 10 SAY "The database shows a total of ";
+STR(Cat2,6,0)+" category II QDRs."
@ Mcnt+6, 10 SAY "There are a total of "+;
"STR(Cat0,6,0)+" cases in the"+;
" database"
@ Mcnt+7, 10 SAY "that are not identified as "+;
"either category I or II."

IF Crt = T
@ 23, 10 SAY "END OF CATEGORY REPORT"
@ 24, 10 SAY "Do a <Carriage Return> to continue"
WAIT
ERASE
SELECT PRIMARY
USE B:QDR
DO Menu
ELSE
EJECT
SET PRINT OFF
SET SCREEN ON
SET FORMAT TO SCREEN
SELECT PRIMARY
USE B:QDR
DO Menu
ENDIF Crt
ENDDO Continue

```

**APPEND RECORDS TO THE DATABASE (ADDREC. PRG)**

SET TALK OFF  
USE B:Qdrtemp  
APPEND  
ERASE  
@ 5, 15 SAY "UPDATING STASTICS FILE, PLEASE STAND ";  
"BY"  
USE B:Qdrtemp  
DO CNTR  
SELECT PRIMARY  
USE B:Qdr  
INDEX ON Case:nr TO B:CASES  
APPEND FROM B:Qdrtemp  
SET SCREEN OFF  
SELECT SECONDARY  
USE B:Qdrtemp  
DELETE ALL  
PACK  
SELECT PRIMARY  
SET SCREEN ON  
RETURN

# DATABASES USED IN VERSION 1.0

STRUCTURE FOR FILE: B:QDR.DBF

NUMBER OF RECORDS: 01252

DATE OF LAST UPDATE: 01/01/80

PRIMARY USE DATABASE

FLD	NAME	TYPE	WIDTH	DEC
001	DATE:IN	N	004	
002	IN:WORK	N	004	
003	CASE:NR	C	009	
004	COG	C	002	
005	TECH:CODE	N	002	
006	ITEM:MGR	C	004	
007	CATEGORY	C	001	
008	TRANSMIT	N	004	
009	RESPONSE	N	004	
010	CLOSEOUT	N	004	
** TOTAL **			00039	

STRUCTURE FOR FILE: B:QDRTEMP.DBF

NUMBER OF RECORDS: 00000

DATE OF LAST UPDATE: 01/01/80

PRIMARY USE DATABASE

FLD	NAME	TYPE	WIDTH	DEC
001	DATE:IN	N	004	
002	IN:WORK	N	004	
003	CASE:NR	C	009	
004	COG	C	002	
005	TECH:CODE	N	002	
006	ITEM:MGR	C	004	
007	CATEGORY	C	001	
008	TRANSMIT	N	004	
009	RESPONSE	N	004	
010	CLOSEOUT	N	004	
011	FLAG	C	001	
** TOTAL **			00040	

STRUCTURE FOR FILE: B:QDRSTATS.DBF  
 NUMBER OF RECORDS: 00001  
 DATE OF LAST UPDATE: 01/01/80  
 PRIMARY USE DATABASE

FLD	NAME	TYPE	WIDTH	DEC
001	TOTAL	N	010	
002	AWTG	N	010	
003	JOB	N	010	
004	PROCESS	N	010	
005	CATO	N	010	
006	CAT1	N	010	
007	CAT2	N	010	
008	RESPONSE	N	010	
009	CLOSEOUT	N	010	
010	TIME	N	010	
011	COUNTER	N	010	
012	TRAN	N	010	
013	CLOSED	N	010	
** TOTAL **			00131	

STRUCTURE FOR FILE: B:SORTFILE.DBF  
 NUMBER OF RECORDS: 00008  
 DATE OF LAST UPDATE: 01/01/80  
 PRIMARY USE DATABASE

FLD	NAME	TYPE	WIDTH	DEC
001	TECH	N	002	
002	COUNTER	N	010	
** TOTAL **			00013	

STRUCTURE FOR FILE: B:IMCOUNT.DBF  
 NUMBER OF RECORDS: 00013  
 DATE OF LAST UPDATE: 01/01/80  
 PRIMARY USE DATABASE

FLD	NAME	TYPE	WIDTH	DEC
001	IM	C	004	
002	CCUNTER	N	010	
** TOTAL **			00015	

STRUCTURE FOR FILE: B:TECHCODE.DBF  
NUMBER OF RECORDS: 00008  
DATE OF LAST UPDATE: 01/01/80  
PRIMARY USE DATABASE  
FLD NAME TYPE WIDTH DEC  
001 TECH N 002  
002 COUNTER N 010  
\*\* TOTAL \*\* 00015

## APPENDIX B

This data dictionary is divided in to two parts. The first part is a definitions section. Each variable used in the application program is listed alphabetically. Modules that it can be found in are listed in parenthesis. A short definition below the variable name is given to aid in understanding program logic.

The second section is a listing (by module) of equations used in the program to show variable computations.

## SECTION ONE

### **AMTS (TAT, MGR, CNTR)**

Total awaiting process time of all QDR's received at FMSO. This time is measured in terms of how long a QDR waited for a Supply System Analyst to actually start working the case up.

### **CASELOAD (MENU)**

Name of a module within the application program that computes the number of cases handled by each Supply System Analyst (as identified by their unique tech codes), percentage of total cases handled by the analyst and the average number of cases computed as a function of actual number of analysts currently assigned divided into the total number of cases on the data base.

### **CASE:NR (QDRTEMP.DBF, ADDREC, QDREDIT, QDR.DBF)**

Unique number assigned to a QDR case at the time of its process at FMSO.

### **CASES (ADDREC, QDREDIT)**

Temporary data base file in which the data base is indexed on case number for the purpose of sorting or keying on the case number.

### **CATS (MGR, CNTR, QDREDIT, QDRSTATS.DBF)**

Variable that contains the total number of QDR cases not identified as either Category 1 or 2. This number indicates the total number of records contained on the database that are in error in this field.

### **CAT1 (MGR, CNTR, QDREDIT, QDRSTATS.DBF)**

Total number of Category 1 QDR's presently on the database.

### **CAT2 (MGR, CNTR, QDREDIT, QDRSTATS.DBF)**

Total number of Category 2 QDR's presently on the database.

**CATEGORY (QDRTEMP.DBD, CNTR, QDREDIT, QDR.DBF)**

      Name of field in main data base. Field in a one digit character that contains either a '1' or a '2'.

**CANTS (QDREDIT)**

      Variable used to compute the total time a case spends awaiting process after arrival at FMSO. This variable is used in the module for editing records. (See Awtg)

**CCASE:NR (QDREDIT)**

      Variable used to copy the case number of a data base record during the record editing process. (See Case:nr)

**CCATEGORY (QDREDIT)**

      Variable used to copy the category of a case to a temporary variable used in the editing process. (See Category)

**CCLOSED (QDREDIT)**

      The total number of days between when an Item Manager responds back to FMSO and when FMSO closes out the case. Variable is used in the record editing process.

**CCLOSEOUT (QDREDIT)**

      Variable used to copy the closeout date from current record to temporary variable used in the editing process. (See Closeout)

**CCOG (QDREDIT)**

      Variable used to copy the COG code of a case to a temporary variable used in the editing process. (See COG)

**CDATE:IN (QDREDIT)**

      Variable used to copy the date a case arrived at FMSO to a temporary variable used in the editing process. (See Date:in)

**CITEM:NGR (QDREDIT)**

Variable used to copy the Item Manager code to a temporary variable used in the editing process. (See Item:ngr)

**CIN:WORK (QDREDIT)**

Variable used to copy the date a case was actually started in process by a Supply System Analyst to a temporary variable used in the editing process. (See In:work)

**CJOB (QDREDIT)**

Variable used to compute the total process time it takes a Supply System Analyst to process a case and send it to the Item Manager. This variable is used in the editing process. (See Job)

**CLOSED (NGR, CNTR, QDRSTATS.DBF, TAT)**

Variable containing total number of cases closed out. Used in computations to compute averages for reports generation.

**CLOSEOUT (NGR, QDRTEMP.DBF, CNTR, QDREDIT, QDR.DBF, QDRSTATS.DBF, TAT)**

One of ten fields on main data base. Field contains data that the QDR case was actually closed out (Disposition instructions having been completed).

**COG (NGR, QDRTEMP.DBF, CNTR, QDR.DBF)**

Cognizance Group as identified by the Naval Supply System. One of ten fields in the main data base file composed of a two digit character.

**COBCOUNT (NGR, CNTR, QDREDIT)**

Name of a data base file used to store the COG codes and the number of cases involving particular COG's.

**CONTINUE (CASELOAD, NGR, TAT)**

DO WHILE loop condition code used to determine whether a loop should or should not be continued. Condition is set to either True or False prior to the execution of the loop and reset within the loop in order to exit the loop.

**CNTR (ADDREC, MAIN)**

Name of module within the program used to compute variable totals and update the QDRSTATS data base file.

**COUNTER (MGR, CASELOAD, INCOUNT.DBF, TECHCODE.DBF, SORTFILE.DBF, CNTR, QDREDIT, QDRSTATS.DBF, TAT)**

Variable used to total various counts needed for other computations.

**CPROCESS (QDREDIT)**

Variable used to compute the total time it takes a case to be processed and sent to an Item Manager. This variable is used in the editing process. (See Process)

**CRESPONSE (QDREDIT)**

Variable used to copy the date at which the case is responded to by the Item Manager back to FMSO with disposition instructions. (See Response)

**CRT (CASELOAD, MGR, TAT)**

DO WHILE loop condition code used to determine whether a loop should or should not be continued. The condition is set to either True or False prior to the execution of the loop and reset within the loop in order to exit the loop.

**CTECHCODE (QDREDIT)**

Variable used in the editing process to identify changes in the unique Supply System Analyst code. (See Tech:code)

**CTIME (QDREDIT)**

Variable used in the editing process to compute the total days involved in the total turnaround time that it takes to process a case from beginning to closeout. (See Time)

**CTRANSMIT (QDREDIT)**

Variable used to copy the date at which the case is sent to the Item Manager. (See Transmit)

**DATE:IN (QDRTEMP.DBF, CNTR, QDREDIT, QDR.DBF)**

Julian date QDR case is received at FMSO for processing. Turnaround time is computed from this date.

**FLAG (QDRTEMP.DBF)**

This is a field no longer in use and is marked for exclusion in future versions.

**IN (INCOUNT.DBF, CNTR, QDREDIT, MGR)**

A field in the Incount data base file used to identify the various Item Managers involved in the QDR process.

**INCOUNT (MGR, CNTR)**

Data base file used to keep track of all Item Managers and total number of cases processed involving a given Item Manager.

**IN:WORK (QDRTEMP.DBF, CNTR, QDREDIT, QDR.DBF)**

Julian date that a Supply System Analyst actually starts processing the QDR.

**ITEM:MGR (QDRTEMP.DBF, CNTR, QDREDIT, QDR.DBF)**

Data base field used to identify the Item Manager of a case. This is one of ten fields to a record used in the data base. Field is a character field composed of four digits.

**JOB (TAT, QDRSTATS.DBF, CNTR, MGR)**

Variable used to total up all the days required to process cases at FMSO prior to being sent to an Item Manager. This variable is then divided by the total number of cases sent to Item Managers to give an average number of days required to actually process a case.

**MAAPT (MGR, TAT)**

Memory variable that contains the average awaiting process time for cases processed in FMSO. (See TAT.PRG in Section Two for actual method computation.)

**MACL (MGR, CASELOAD)**

Memory variable that contains the average case load based on actual number of analysts assigned to the office divided into the total number of records on the data base. (See CASELOAD.PRG in Section Two for actual method of computation.)

**MANAL (CASELOAD, MGR)**

Memory variable read into the program from the keyboard as a result of a programmed query. Variable is the actual number of analysts currently assigned to the office.

**MAPT (MGR, TAT)**

Memory variable containing the average time that it takes for a case to be processed and sent to an Item Manager. (See TAT.PRG in Section Two for actual method of computation.)

**MAWTS (CNTR, QDREDIT)**

Memory variable that contains the total time in days that cases sit in the queue awaiting process by an analyst. (See CNTR.PRG in Section Two for actual method of computation.)

**MCASENR (QDREDIT)**

Memory variable read from the keyboard as a result of a request from the program. This variable is the case number that the operator desires to view for possible editing.

**MCATS (CNTR)**

Memory variable that contains the total number of cases not identified as either category 1 or 2. If this variable contains anything but a zero, then there are the same number of records in error.

**MCAT1 (CNTR)**

Memory variable that contains the total number of category 1 QDR's.

**MCAT2 (CNTR)**

Memory variable that contains the total number of category 2 QDR's.

**MCLOSE (CNTR)**

Memory variable that contains the total number of cases that have been closed out.

**MCLOSEOUT (CNTR, QDREDIT)**

Memory variable that contains the total number of days that it takes the Supply System Analysts to implement disposition instructions and close cases out. Variable is used to compute averages in reports generation. (See CNTR.PRG in Section Two for actual method of computation.)

**MCNT (MGR)**

Memory variable used as an incremental counter for the purpose of determining the line number of the next line of print during report generation.

**MCNTR (CASELOAD)**

Memory variable used as an incremental counter for the purpose of determining the line number of the next line of print during report generation.

**MCDS (CNTR)**

Memory variable that COG code is placed into for comparison as to whether the COG is a new COG or one that has been used before. If it is new, then it is added to the COG list and the counter is set to 1. If it already exists, then the counter is incremented by 1.

**MCOT (MGR, TAT)**

Memory variable containing the average time in days that it takes analysts to implement disposition instructions from Item Managers and close the case out. (See TAT.PRG in Section Two for actual method of computation.)

**MCOUNT (CNTR)**

Memory variable that contains the total number of cases responded to by Item Managers with disposition

instructions. Variable is used to compute averages during reports generation.

**MCOUNTER (QDREDIT)**

Memory variable used to keep track of the number of times an event occurs. A general counter.

**MENU (MGR, MAIN, TAT, CASELOAD)**

Name of primary module within the program used to call modules to either add/edit records or generate required reports.

**MFLAG (CNTR, QDREDIT)**

DO WHILE loop condition code used to determine whether a loop should or should not be continued. Condition is set to either True or False prior to the execution of the loop and reset within the loop in order to exit.

**MFLAG1 (QDREDIT)**

See MFLAG above.

**MFLAG2 (QDREDIT)**

See MFLAG above.

**MIM (CNTR)**

Memory variable that the Item Manager code is placed into for comparison as to whether the Item Manager code is a new code or one that has been used before. If it is new, then it is added to the Item Manager list and the counter is set to 1. If it already exists, then the counter is incremented by 1.

**MIMR (MGR, TAT)**

Memory variable containing the average number of days that it takes an Item Manager to respond back to FMSO with actual disposition instructions. (See TAT.PRG in Section Two for actual method of computation.)

**MJOB (CNTR, QDREDIT)**

Memory variable that contains the total number of days that it took to actually process cases prior to

sending them out to the Item Managers. (See CNTR.PRG in Section Two for actual method of computation.)

**MPC (NGR, CASELOAD)**

Memory variable used to store percentages of cases handled by a given Supply System Analyst. Percentage is computed by dividing the total number of cases processed through FMSO into the number of cases handled by the analyst.

**MPROCESS (CNTR, QDREDIT)**

Memory variable used to store the total number of days that it takes a case to be processed from arrival at FMSO to being sent to the Item Manager. This variable is used in the initial turnaround time computations in reports generation. (See CNTR.PRG in Section Two for actual method of computation.)

**MRESPONSE (CNTR, QDREDIT)**

Memory variable that contains the total number of days that it takes Item Managers to respond back to FMSO with disposition instructions. This variable is used to compute an average response time during reports generation. (See CNTR.PRG in Section Two for actual method of computation.)

**MBO (NGR)**

Memory variable that contains the total number of cases still being processed by Item Managers. (See NGR.PRG in Section Two for actual method of computation.)

**MTAT (NGR, TAT)**

Memory variable containing the average turnaround time from arrival to sending a case to the Item Manager. (See TAT.PRG in Section Two for actual method of computation.)

**NTECH (CNTR)**

Memory variable that Tech:code is placed into for comparison as to whether the tech code is a new code or one that has been used before. If it is a new code, then it is added the list of codes and the counter is set to 1. If it already exists on the data base, then the counter is incremented by 1.

**NTIME (MGR, CNTR, QDREDIT, TAT)**

Memory variable that contains the total number of days that it has taken to process all cases from arrival in FNSO to the final close out of the case. This variable is used to compute their average overall turnaround time to process a case from beginning to end. (See CNTR.PRG in Section Two for actual method of computation.)

**NTIP (MGR)**

Memory variable containing the total number of cases being closed out by the analysts. (See MGR.PRG in Section Two for actual method of computation.)

**NTOH (MGR)**

Memory variable that contains the total number of cases in the office being processed the analysts less the cases in the queue awaiting an analyst to be available to handle them. (See MGR.PRG in Section Two for the actual method of computation.)

**NTOTAL (CNTR)**

Memory variable that contains the total number of cases being processed by the count module. This total is then added to the overall total number of cases on the data base kept in the statistics data base file (QDRSTAT.DBF).

**MTRAN (CNTR)**

Memory variable that contains the total number of cases that have been sent to an Item Manager. This total is computed based on the cases being processed by the count module. This total is then added to the overall total number sent to Item Managers kept in the statistics data base file (QDRSTAT.DBF).

**MMORK (CNTR)**

Memory variable used as a scratch pad during various computations.

**P.CATEGORY (QDREDIT)**

See CATEGORY. 'P.' identifies the variable as belonging to the primary data base file when two files are at the same time. See the command SELECT in the dBase II manual for a more complete explanation.

**P.CLOSEOUT (QDREDIT)**

See CLOSEOUT. See P.CATEGORY above.

**P.COG (QDREDIT)**

See COG. See P.CATEGORY above.

**P.ITEM:MGR (QDREDIT)**

See ITEM:MGR. See P.CATEGORY above.

**P.RESPONSE (QDREDIT)**

See RESPONSE. See P.CATEGORY above.

**PROCESS (MGR, CNTR, QDRSTATS.DBF, TAT)**

Total number of days needed to process a case from arrival at FHSO to being sent to an Item Manager. This total is used in computation during reports generation to produce the initial turnaround time. (See QDRSTATS.DBF in Section Two for actual method of computation.)

**P.TECHCODE (QDREDIT)**

See TECHCODE. See P.CATEGORY above.

**P.TRANSMIT (QDREDIT)**

See TRANSMIT. See P.CATEGORY above.

**QDR (MAIN, QDREDIT, ADDRREC)**

Main data base. Contains all cases processed by FHSO. Each case is entered on to a ten field record and maintained on line.

**QDRSTATS (CASELOAD, QDREDIT, TAT, MGR)**

Name of a data base file used to store total counts of various aspects of the data on cases for management reports generation.

**QDRTEMP (ADDREC)**

Name of a data base file used to store new records prior to their addition to the main data base.

**REPLY (MGR, CASELOAD, TAT)**

Input variable name used to identify keyboard responses at various points in the program process.

**RESPONSE (MGR, QDRTEMP.DBF, CNTR, QDREDIT, QDR.DBF, QDRSTATS.DBF, TAT)**

Julian date a case is received back from an Item Manager with disposition instruction (See QDR.DBF for make up of field).

**S.COG (QDREDIT)**

See COG. 'S.' is used to identify a variable in the secondary data base file that is open at the same time as a primary data base file. See the SELECT command in the dBase II manual for a complete explanation.

**SORTCOG (MGR)**

Sorts COG codes and arranges them in ascending alphabetical order.

**SORTFILE (MGR, CASELOAD)**

Temporary data base file used to keep track of the Supply System Analyst codes and the total cases handled by each analyst.

**SORTIM (MGR)**

Sorts Item Manager codes and arranges them in ascending alphabetical order.

**S.ITEM:MGR (QDREDIT)**

See ITEM:MGR. See S.COG above.

**TECH** (CASELOAD, MGR, TECHCODE.DBF, SORTFILE.DBF, QDREDIT)

A field containing the Tech:code arranged in ascending numeric order.

**TECHCODE** (CNTR, CASELOAD, MGR, QDREDIT)

Name of data base file used to maintain a listing of Supply System Analyst codes and the total number of cases handled by each analyst.

**TECH:CODE** (CNTR, QDREDIT, QDRTEMP.DBF)

Unique two digit code used to identify the Supply System Analyst who is or has worked up a given case.

**TIME** (CNTR, TAT, MGR)

The total time of process from date in to close out of a case. Used to compute average turnaround time of a case from initial receipt at FMSO to the time that FMSO closes the case out and places it in a history file.

**TRAN** (MGR, CNTR, QDREDIT, QDRSTATS, TAT)

Variable containing total number of cases sent to Item Managers by FMSO. Used to compute averages in computations for reports generation.

**TRANSMIT** (QDRTEMP.DBF, CNTR, QDREDIT, QDR.DBF)

Julian date a case is sent from FMSO to the Item Manager for further processing.

**TOTAL** (MGR, CASELOAD, CNTR, QDRSTATS, TAT)

Variable containing the total number of cases in the data base. This variable is used to compute various averages in computations for reports generation.

**X (MAIN)**

Variable used to create a pause within a program which allows the operator to read messages on the screen (CRT) prior to continuation of the program execution. In this manner, the operator need not make any keyboard response inorder to continue.

## SECTION TWO

### CASELOAD. PRB

TOTAL/MANAL \* 1.00 = MACL  
COUNTER/TOTAL \* 100.00 = NPC

### NER. PRB

PROCESS/TOTAL \* 1.00 = MTAT  
AWTG/TRAN \* 1.00 = MAAPT  
JOB/TOTAL \* 1.00 = MAPT  
RESPONSE/COUNTER \* 1.00 = MINR  
CLOSEOUT/CLOSED \* 1.00 = MCOT  
TIME/COUNTER \* 1.00 = MTIME  
TOTAL - TRAN = MTOH  
COUNTER - CLOSED = MTIP  
TRAN - COUNTER = MSO  
TOTAL/MANAL \* 1.00 = MACL  
COUNTER/TOTAL \* 100.00 = NPC

### TAT. PRB

PROCESS/TOTAL \* 1.00 = MTAT  
AWTG/TRAN \* 1.00 = MAAPT  
JOB/TOTAL \* 1.00 = MAPT  
RESPONSE/COUNTER \* 1.00 = MINR  
CLOSEOUT/CLOSED \* 1.00 = MCOT  
TIME/COUNTER \* 1.00 = MTIME

### CNTR. PRB

NTOTAL \* 1 = NTOTAL  
IN:WORK - DATE:IN = MAWTG  
CATEGORY = 0, 1, OR 2  
TRANSHIT - IN:WORK = MJOB  
TRANSHIT - DATE:IN = MPROCESS  
RESPONSE - TRANSHIT = MRESPONSE  
CLOSEOUT - RESPONSE = MCLOSEOUT  
CLOSEOUT - DATE:IN = MTIME

**GDSTATE.DBF**

TOTAL = NTOTAL + TOTAL  
AWTG = MAWTG + AWTG  
JOB = MJOB + JOB  
PROCESS = MPROCESS + PROCESS  
CATO = MCATO + CATO  
CAT1 = MCAT1 + CAT1  
CAT2 = MCAT2 + CAT2  
RESPONSE = MRESPONSE + RESPONSE  
CLOSEOUT = MCLOSEOUT + CLOSEOUT  
TIME = MTIME + TIME  
COUNTER = MCOUNT + COUNTER  
TRAN = MTRAN + TRAN  
CLOSED = MCLOSE + CLOSED

**GDREDIT.PRB**

DATE:IN = CDATE:IN  
IN:WORK = CIN:WORK  
CASE:NR = CCASE:NR  
COG = CCOG  
TECH:CODE = CTECH:CODE  
ITEM:MGR = CITEM:MGR  
CATEGORY = CCATEGORY  
TRANSMIT = CTRANSMIT  
RESPONSE = CRESPONSE  
CLOSEOUT = CCLOSEOUT  
AWTG = AWTG + MAWTG - CAWTG  
JOB = JOB + MJOB - CJOB  
PROCESS = PROCESS + MPROCESS - CPROCESS  
RESPONSE = RESPONSE + MRESPONSE - CRESPONSE  
CLOSEOUT = CLOSEOUT + MCLOSEOUT - CCLOSEOUT  
TIME = TIME + MTIME - CTIME

**SHORTFILE.DBF**

TECH = MTECH + TECH:CODE  
COUNTER = COUNTER + 1

**INCOUNT.DBF**

IN = (See IN in Section One.)  
COUNTER = COUNTER + 1

**TECHCODE.DBF**

TECH = (See TECH in Section One.)  
COUNTER = COUNTER + 1

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